AL.2.1998-412

EURASIAN WATER MILFOIL
ALBERTA LAKE SURVEY
1983

Alberta
ENVIRONMENT
Pollution Control Division
Pesticide Chemicals Branch

CANADIANA
SEP 2 5 1990

EURASIAN WATER MILFOIL
ALBERTA LAKE SURVEY
1983

REPORT PREPARED BY:
Edward C. Stockerl
and
Robert L. Kent

Alberta Environment
Pollution Control Division
Pesticide Chemicals Branch

March, 1984

ABSTRACT

Forty-seven Alberta lakes and reservoirs were surveyed during 1983 to provide early detection of possible Eurasian water milfoil (Myriophyllum spicatum L.) infestations. Due to time and manpower limitations, only high priority sites (particularly boat launch areas) were surveyed. Descriptions of each survey site, including the aquatic plant species observed was documented.

Forty-two aquatic plant species belonging to 27 genera were identified. Wabamun Lake demonstrated the highest species diversity (21 spp.). No Eurasian water milfoil was found at any of the water bodies surveyed. Northern water milfoil (Myriophyllum exalbescens Fern.) was the most commonly observed species, occurring in 38 of the 47 water bodies. Richardson's pond weed (Potamogeton richardsonii (Benn.) Rydb.) was observed at 37 water bodies.

Potamogeton richardsonii was dominant or most abundant at 15 water bodies while M. exalbescens was dominant at 11 water bodies.

Each of the 47 lakes and reservoirs surveyed during 1983 contained a variety of habitats for aquatic macrophyte growth. Although the diversity and abundance of aquatic plant species varied considerably from one water body to the next, all possessed the basic habitat requirements necessary for the growth of Eurasian water milfoil.

TABLE OF CONTENTS

PAGE

ABSTRACT i

TABLE OF CONTENTS ii

LIST OF FIGURES iii

LIST OF TABLES v

1.0 INTRODUCTION 1

2.0 METHODS 2

3.0 RESULTS AND DISCUSSION 9

3.1 SITE DESCRIPTIONS 20

REFERENCES 43

APPENDIX 44

LIST OF FIGURES

FIGURE		PAGE
1	Location of Alberta Lakes and Reservoirs Surveyed for Eurasian Water Milfoil in 1983	5
2	Location of Northern Alberta Lakes Surveyed for Eurasian Water Milfoil in 1983	6
3	Location of Southern Alberta Lakes and Reservoirs Surveyed for Eurasian Water Milfoil in 1983	7
4	Lac La Biche	45
5	Skeleton Lake	46
6	Cross (Steele) Lake	47
7	Long Lake	48
8	Cold Lake (Alberta portion)	49
9	Moose Lake	50
10	Garner Lake	51
11	Muriel Lake	52
12	Thunder Lake	53
13	Lac La Nonne	54
14	Lac St. Anne	55
15	Isle Lake	56
16	Wabamun Lake	57
17	Cooking Lake	58
18	Miquelon Lake	59
19	Wizard Lake	60
20	Pigeon Lake	61
21	Buck Lake	62
22	Gull Lake	63
23	Buffalo Lake	64
24	Jack Fish Lake	65

Digitized by the Internet Archive
in 2016

https://archive.org/details/eurasianwatermil00stoc_1

LIST OF FIGURES continued ....

FIGURE PAGE

25 Crimson Lake 66

26 Twin Lakes 67

27 Sylvan Lake 68

28 Dillberry Lake 69

29 Gooseberry Lake 70

30 Pine Lake 71

31 Little Fish Lake 72

32 Glenmore Reservoir 73

33 Chestermere Lake 74

34 McGregor Reservoir 75

35 Lake Newell Reservoir 76

36 Chain Lake Reservoir 77

37 Travers Reservoir 78

38 Keho Lake Reservoir 79

39 Park Lake Reservoir 80

40 Chin Lakes Reservoir 81

41 Elkwater Lake 82

42 Spruce Coulee Reservoir 83

43 Reesor Lake Reservoir 84

44 Crowsnest Lake 85

45 Island Lake 86

46 Beauvais Lake 87

47 Beaver Mines Lake 88

48 Waterton Reservoir 89

49 St. Mary Reservoir 90

50 Police (Outpost) Lake 91

LIST OF TABLES

TABLE		PAGE
1	Alberta Lakes and Reservoirs Surveyed for the Presence of Eurasian Water Milfoil in 1983	3
2	Aquatic Plant Species Identified During 1983 Eurasian Water Milfoil Lake Survey	10
3	Aquatic Plant Species Observed at Each Lake or Reservoir During 1983 Eurasian Water Milfoil Lake Survey	11
4	Occurrence of Aquatic Plants in Alberta Lakes and Reservoirs Surveyed During 1983	19

1.0 INTRODUCTION

Eurasian water milfoil (*Myriophyllum spicatum* L.) is a perennial submergent aquatic plant, originally endemic to Europe and Asia. The introduction of this nuisance weed to North America is believed to have first occurred in Chesapeake Bay, Maryland in the latter part of the 19th century (Bayley *et al*., 1968). Since its introduction to North America, Eurasian water milfoil has become a major nuisance in at least 22 States, including Washington (Stockerl and Kent, 1984). The presence of *M. spicatum* in Canadian waters was first recorded in Rondeau Provincial Park (Lake Erie) in 1961 (Wile, 1978). Its current distribution in Canada includes a number of water bodies in southern Ontario and Quebec, and in the Okanagan basin and Lower Mainland region of British Columbia. Most recently (the summer of 1981), Eurasian water milfoil had spread to Champion Lake near Trail, B.C. and to Shuswap Lake north of Vernon, B.C.

The highly adaptive nature and prolific growth rate of *M. spicatum* has resulted in serious problems in many valuable water systems throughout North America. Detrimental impacts which have resulted from *M. spicatum* infestations include: interference with boat navigation, reduced quality of water supplies, reduction of shore fish spawning habitat, and the decline of the recreational capability and aesthetic value of many water systems.

Although localized control measures may relieve the nuisance level and reduce further spread, mechanical and chemical controls are often costly and labour intensive. Also, attempts to control established Eurasian water milfoil infestations have shown that eradication is difficult, and in most cases unrealistic (Anon., 1981). "Detecting and responding to early infestations of Eurasian water milfoil is necessary to avoid the high costs and intrinsic difficulties involved in having to deal with established weed populations" (Shea and O'Shea, 1981). This demonstrates the necessity to identify and control infestations while still in the pioneer stage.

The recent (1981) eastward spread of _M. spicatum_ in British Columbia indicates that the threat of this weed entering Alberta waters is a real one. Eurasian water milfoil has the ability to tolerate and thrive in a wide range of habitats and environmental conditions. Therefore, it could survive in Alberta waters, if introduced (Stockerl and Kent, 1984). The eventual spread of Eurasian water milfoil into Alberta appears likely and may only be a matter of time. It threatens to jeopardize Alberta's already limited supply of high quality recreational lakes, as well as the extensive irrigation systems in the south.

In continuation of the 1981 and 1982 survey efforts (Shea and O'Shea, 1981; Stockerl _et al_., 1984), 47 selected lakes and reservoirs were surveyed during the summer of 1983 to provide the early detection of possible Eurasian water milfoil infestations. This report provides a summary of the 1983 survey results and provides an information base.

2.0 METHODS

Forty-seven Alberta lakes and reservoirs (Table 1) were surveyed for the presence of Eurasian water milfoil between June 27 and August 30, 1983. These lakes and reservoirs included 33 of the 34 water bodies sampled in 1982 (Stockerl _et al_., 1984). The Kananaskis Lakes

Table 1: Alberta Lakes and Reservoirs Surveyed for the Presence of Eurasian Water Milfoil in 1983.

Ref. #	Name of Lake or Reservoir	Location (Twp-Rge-WM)	General Location
1.	Lac La Biche*	(68-13-W4)	160 km NE - Edmonton
2.	Skeleton Lake	(65-18,19-W4)	5 km NE - Boyle
3.	Cross (Steele) Lake*	(65-26-W4)	130 km N - Edmonton
4.	Long Lake*	(63-18-W4)	110 km NE - Edmonton
5.	Cold Lake*	(64-1-W4)	45 km NE - Bonnyville
6.	Moose Lake*	(60-7-W4)	4 km W - Bonnyville
7.	Garner Lake*	(60-12-W4)	5 km N - Spedden
8.	Muriel Lake*	(59-5-W4)	11 km S - Bonnyville
9.	Thunder Lake*	(60-6-W5)	25 km W - Barrhead
10.	Lac La Nonne	(57-3-W5)	60 km NW - Edmonton
11.	Lac St. Anne	(54-3-W5)	60 km NW - Edmonton
12.	Isle Lake	(54-6-W5)	65 km W - Edmonton
13.	Wabamun Lake*	(52,54-5-W5)	40 km W - Edmonton
14.	Cooking Lake	(51-21-W4)	40 km SE - Edmonton
15.	Miquelon Lake*	(49-19-W4)	26 km N - Camrose
16.	Wizard Lake	(48-27-W4)	16 km S - Calmar
17.	Pigeon Lake*	(47-1-W5)	38 km W - Wetaskiwin
18.	Buck Lake	(46-6-W5)	70 km N - Rocky Mtn. House
19.	Gull Lake*	(41-28-W4)	14 km W - Lacombe
20.	Buffalo Lake*	(40-20-W4)	10 km SE - Bashaw
21.	Jack Fish Lake	(41-11-W5)	20 km E - Nordegg
22.	Crimson Lake*	(40-8-W5)	10 km NW - Rocky Mtn. House
23.	Twin Lakes*	(40-7-W5)	5 km NW - Rocky Mtn. House
24.	Sylvan Lake*	(39-1,2-W5)	19 km W - Red Deer
25.	Dillberry Lake*	(42-1-W4)	30 km NE - Provost
26.	Gooseberry Lake*	(36-5-W4)	15 km N - Consort
27.	Pine Lake	(36-24-W4)	24 km E - Penhold
28.	Little Fish Lake*	(28-16-W4)	40 km E - Drumheller
29.	Glenmore Reservoir	(23-1-W5)	S.W. Calgary
30.	Chestermere Lake	(24-28-W4)	12 km E - Calgary
31.	McGregor Reservoir	(16-21-W4)	28 km E - Vulcan
32.	Lake Newell Reservoir*	(17-15-W4)	14 km S - Brooks
33.	Chain Lake Reservoir*	(15-2-W5)	38 km SW - Nanton
34.	Travers Reservoir*	(14-20-W4)	16 km E - Champion
35.	Keho Lake Reservoir	(11,12-22,23-W4)	5 km SE - Barons
36.	Park Lake Reservoir*	(10-22-W4)	14 km NW - Lethbridge
37.	Chin Lakes Reservoir	(7-16,17-W4)	20 km S - Taber
38.	Elkwater Lake*	(8-3-W4)	58 km SE - Medicine Hat
39.	Spruce Coulee Reservoir*	(8-2-W4)	58 km SE - Medicine Hat
40.	Reesor Lake Reservoir*	(8-1-W4)	58 km SE - Medicine Hat
41.	Crowsnest Lake	(8-5-W5)	10 km W - Coleman
42.	Island Lake	(8-5-W5)	15 km W - Coleman
43.	Beauvais Lake*	(5-1-W5)	20 km SW - Pincher Creek
44.	Beaver Mines Lake	(5-2-W5)	25 km W - Pincher Creek
45.	Waterton Reservoir	(4-28-W4)	20 km SE - Pincher Creek
46.	St. Mary Reservoir	(5-24-W4)	8 km W - Spring Coulee
47.	Police (Outpost) Lake*	(1-26-W4)	29 km SW - Cardston

* Indicates presence of lakeside Provincial Park or Campground.

(surveyed as a single water body in 1982) were excluded from the 1983 survey schedule due to lack of available time and to the unlikelihood of the establishment of a pioneer infestation. The additional 13 water bodies surveyed in 1983 were selected primarily on the basis of recreational use by boaters, presence of lakeside provincial parks, and/or proximity to major highway routes leading to and from areas of British Columbia and Washington State, known to have Eurasian water milfoil infestations. The general location of the 47 water bodies surveyed during 1983 is indicated in Table 1 and Figures 1-3.

Due to constraints imposed by manpower limitations, weather conditions and the large number of water bodies included in the 1983 survey schedule, the spot check approach used in the 1981-82 surveys was again adopted. Rather than surveying the entire littoral zone, only certain areas considered to be priority sites were surveyed at each lake or reservoir. Exceptions were occasionally made when surveying small water bodies, such as Crimson Lake and Beauvais Lake. Since boater transport of weed material has been implicated with Eurasian water milfoil spread (Dove and Malcolm, 1980; Scales and Bryan, 1979), littoral areas surrounding boat launches and docks were considered priority sites. Public launches, particularly those at lakeside provincial parks were given the highest priority. Other areas of concern were: 1) beach areas frequented by boaters; 2) sheltered bays conducive to aquatic plant growth; 3) windward shores; 4) outflow channels and outflow regulating structures; and 5) areas known to be frequented by waterfowl (waterfowl also have been implicated in the spread of Eurasian water milfoil (Buchanan, 1976)). The description and location of survey sites is presented in Section 3.1 and Appendix 1 respectively.

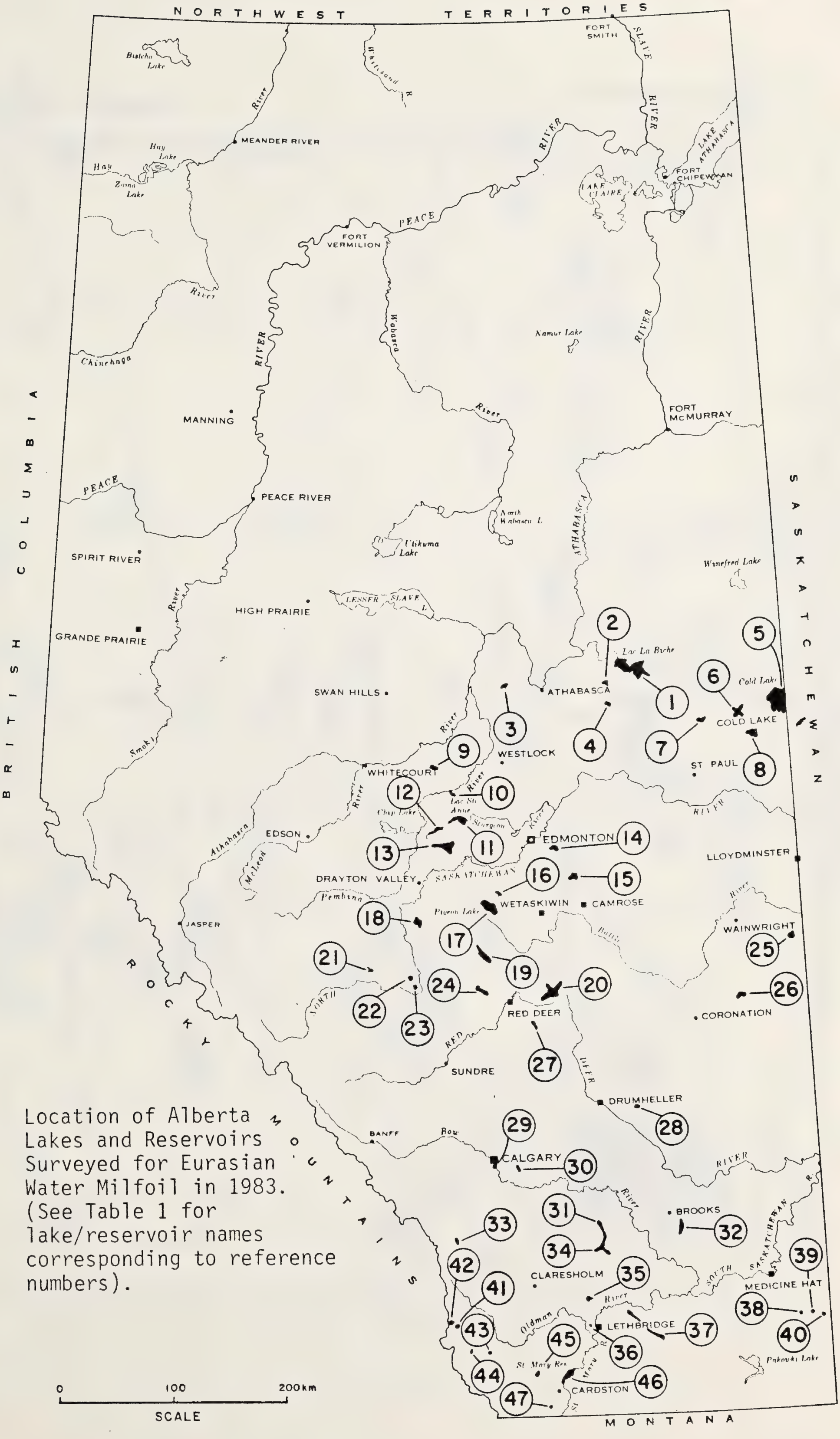


Figure 1: Location of Alberta Lakes and Reservoirs Surveyed for Eurasian Water Milfoil in 1983. (See Table 1 for lake/reservoir names corresponding to reference numbers).

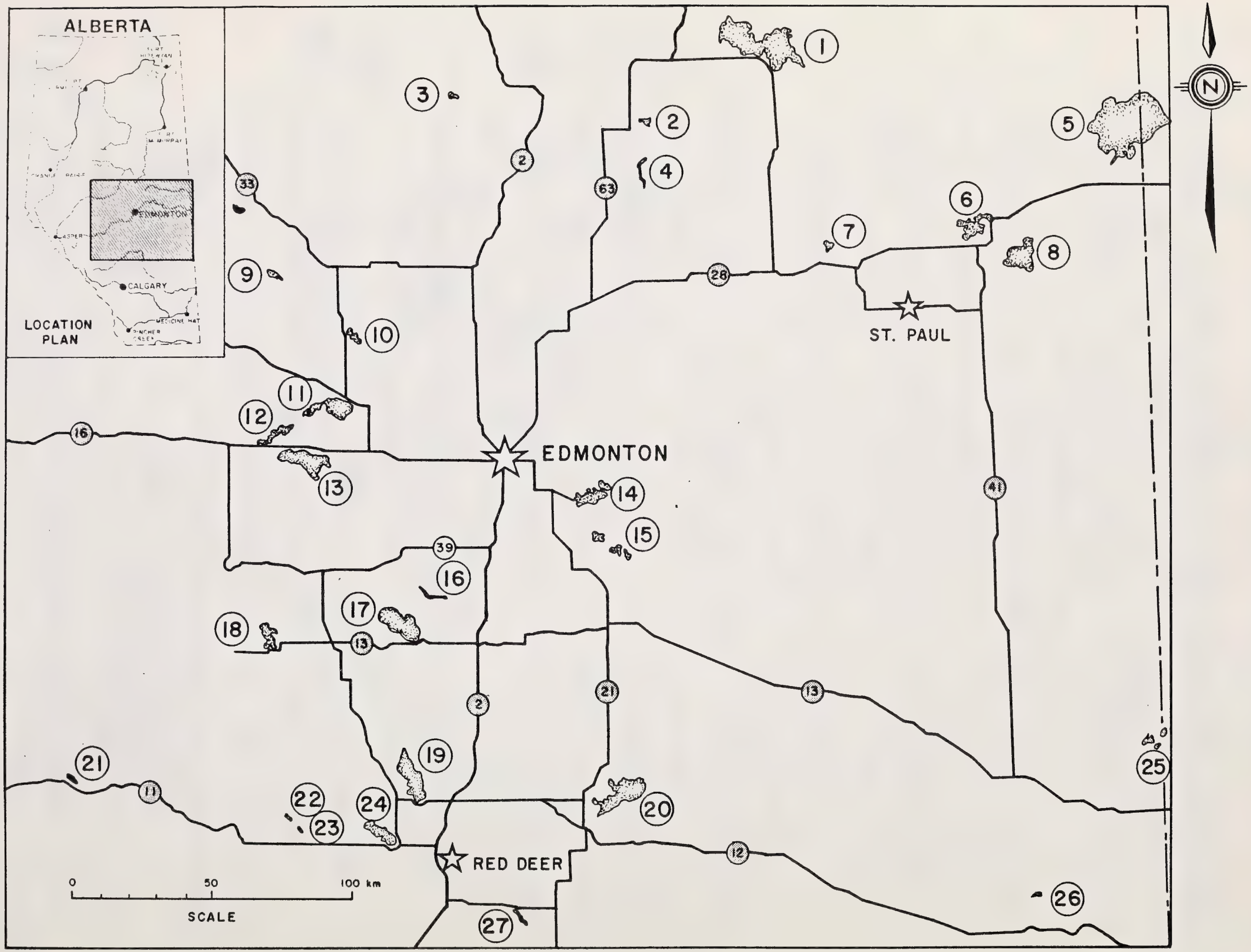


Figure 2: Location of Northern Alberta Lakes and Reservoirs Surveyed for Eurasian Water Milfoil in 1983. (See Table 1 for lake/reservoir names indicated by reference numbers above).

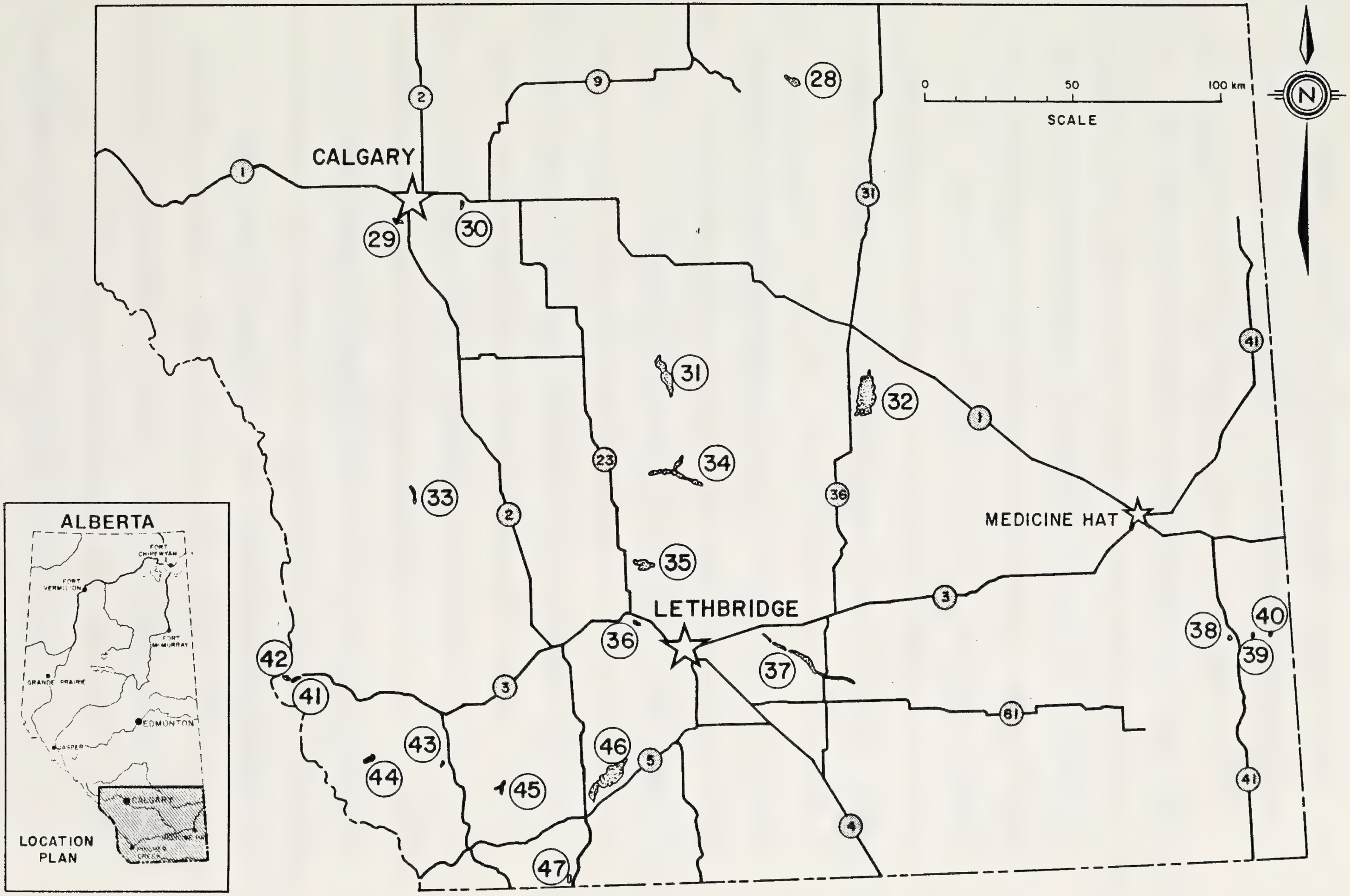


Figure 3: Location of Southern Alberta Lakes and Reservoirs Surveyed for Eurasian Water Milfoil in 1983. (See Table 1 for lake/reservoir names indicated by reference numbers above).

Sites having easy road access were visited by land. Sites or shore areas not readily accessible or sampled from shore were surveyed using a 3.9 m inflatable boat (Zodiac) powered by a 25 hp outboard motor. This craft was well suited for aquatic plant surveys due to its excellent stability, shallow draft, and ease of exit and re-entry from water by snorkellers. As in the 1982 lake survey, the survey of intended sites by boat was in a number of instances abandoned due to unfavorable weather conditions.

Although the priority was to determine the presence of Eurasian water milfoil, overall aquatic plant species composition was documented at each site. Particular attention was given to *Myriophyllum* spp. The dominant or most abundant species also was recorded at each site. Minimal effort was directed at collecting and identifying marginal and emergent aquatic plants beyond the genus level.

Identification of aquatic plant species was achieved through visual observation from the water surface and by close scrutiny of collected samples. Aquatic vegetation beyond the field of clear view (i.e., deep or very turbid water) was sampled by dragging a weed rake along the bottom or by casting out and dragging a four prong grapnel anchor attached to a rope. Both methods were effective in retrieving aquatic plants, often complete with roots. A minimum of four sampling efforts were made at each site where this technique was utilized.

Accurate sampling at high priority sites having poor surface visibility was achieved by snorkelling to the bottom. This procedure afforded relatively accurate and thorough visual inspection. Collection of samples in such instances was done by hand. Final identification of collected plants was done on shore. Plant specimens which were in good condition and not previously collected at that water body were appropriately labelled and preserved. The purpose of preserving collected plants was to add to the established collection of plant species representative of each water body surveyed.

In addition to identifying, documenting, and collecting aquatic plants, site descriptions and general resource folio data not noted during the 1982 survey was collected for each site. Pertinent information recorded included: location of major weed beds, dominant species, shoreline development, water use, recreational areas, underwater obstructions, location of major inflows and outflows, sediment type, water fluctuation, and direction of prevailing winds.

3.0 RESULTS AND DISCUSSION

Forty-two aquatic plant species belonging to 27 genera were identified during the 1983 survey of 47 Alberta lakes and reservoirs (see Table 2). Positive identification of several specimens to species level was not achieved. Incomplete identification was due to either poor specimen condition or immature stage of growth.

Six species noted in the 1982 survey were not observed during the 1983 survey period. These species (five not positively identified in 1982) were *Elodea longivaginata* St. John, *Polygonum amphibium* Muhl., *Potamogeton berchtoldii* Fieb., *P. epihydrous* Raf., *Ranunculus aquatilus* L. and *Zannichellia palustris* L. However, the list of species observed in 1983 included six species not noted in 1982. These new specimens (some only identified to genus level) were, *Isoetes* sp., *Limosella aquatica* L., *Nymphaea* sp., *Potamogeton strictifolius* Bennett, *Spirodela polyrhiza* (L.) Schleid and *Vallisneria americana* Michx.

Table 3 provides a list of the aquatic plant species observed and collected at each water body surveyed during 1983. The greatest

Table 2: Aquatic Plant Species Identified During 1983 Eurasian Water Milfoil Lake Survey. (N=42)

	Scientific Name	Common Name
1.	*Alisma gramineum* Gmel.	Narrowleaf waterplantain
2.	*Callitriche hermaphroditica* L.	Autumnal starwort
3.	*Callitriche heterophylla* Pursh.*	Water starwort
4.	*Callitriche* sp.	Water starwort
5.	*Ceratophyllum demersum* L.	Common coontail
6.	*Chara* sp.	Stonewort
7.	*Elodea canadensis* Michx.	Canada Waterweed
8.	*Equisetum fluviatile* L.	Water horsetail
9.	*E. palustre* L.	Marsh horsetail
10.	*Hippuris vulgaris* L.	Mare's tail
11.	*Isoetes* sp.	Quillwort
12.	*Juncus* sp.	Rush
13.	*Lemna minor* L.	Lesser duckweed
14.	*L. trisulca* L.	Star duckweed
15.	*Limosella aquatica* L.	Mudwort
16.	*Myriophyllum exalbescens* Fern.	Northern water milfoil
17.	*Najas flexilis* (Willd.) R. & S.	Slender naiad
18.	*Nuphar variegatum* Engelm.	Yellow water lily
19.	*Nymphaea* sp.	Water-lily
20.	*Phragmites communis* Trin.	Reed grass
21.	*Polygonum natans* Eaton	Water smartweed
22.	*P. friesii* Rupr.	Fries pondweed
23.	*P. gramineus* L.	Variable pondweed
24.	*P. natans* L.	Floating-leaf pondweed
25.	*P. pectinatus* L.	Sago pondweed
26.	*P. praelongus* Wulf.	Whitestem pondweed
27.	*P. pusillus* L.	Small-leaf pondweed
28.	*P. richardsonii* (Benn.) Rydb.	Richardson pondweed
29.	*P. strictifolius* Bennett*	Narrowleaf pondweed
30.	*P. vaginatus* Turcz.	Large-sheath pondweed
31.	*P. zosteriformis* Fern.	Flat-stemmed pondweed
32.	*Ranunculus circinatus* Sibth.	White waterbuttercup
33.	*Ranunculus* sp.	
34.	*Ruppia maritima* L.	Ditchgrass or Widgeongrass
35.	*Sagittaria cuneata* Sheld.	Arrowhead
36.	*S. latifolia* Willd.*	Broadleaf arrowhead
37.	*Scirpus* sp.	Bulrush
38.	*Sparganium eurycarpum* Engelm.	Giant bur-reed
39.	*Spirodela polyrhiza* (L.) Schleid	Giant duckweed
40.	*Typha latifolia* L.	Common cattail
41.	*Utricularia vulgaris* L.	Common bladderwort
42.	*Vallisneria americana* Michx.*	Vallisneria

* Identification not positive due to poor specimen or lack of reproductive structures.

Table 3: Aquatic Plant Species Observed at Each Lake or Reservoir During 1983 Eurasian Water Milfoil Lake Survey. (Brackets indicate species which were observed in 1982 but not in 1983).

Name of Lake or Reservoir	Aquatic Plant Species Observed[1]	
Beauvais Lake (N=18; where N is No. of spp. present)	Ceratophyllum demersum	(P. praelongus)
	*Chara sp.	P. pusillus
	Elodea canadensis	P. richardsonii
	Equisetum fluviatile	P. vaginatus
	*Juncus sp.	P. zosteriformis
	Myriophyllum exalbescens	Ranunculus circinatus
	Nuphar variegatum	*Scirpus sp.
	Polygonum natans	*Typha latifolia
	Potamogeton natans	Utricularia vulgaris
	P. pectinatus	
Beaver Mines Lake (N=6)	*Juncus sp.	Potamogeton richardsonii
	Myriophyllum exalbescens	P. zosteriformis
	Polygonum natans	*Typha latifolia
Buck Lake (N=3)	*Nuphar sp.	*Sagittaria sp.
	*_Ranunculus sp._	
Buffalo Lake (N=9)	*Juncus sp.	_P. vaginatus_
	Lemna trisulca	_Ruppia maritima_
	Myriophyllum exalbescens	*Scirpus sp.
	Potamogeton pectinatus	*Sparganium eurycarpum
	*P. pusillus	
Chain Lakes (N=13)	Alisma gramineum	Potamogeton natans
	(Callitriche sp.)	P. pectinatus
	Ceratophyllum demersum	_P. pusillus_
	*Chara sp.	_P. richardsonii_
	Hippuris vulgaris	Ranunculus sp.
	*Juncus sp.	*Sagittaria sp.
	Myriophyllum exalbescens	Utricularia vulgaris
Chestermere Lake (N=15)	Alisma gramineum	P. praelongus
	Ceratophyllum demersum	_P. richardsonii_
	*Chara sp.	P. vaginatus
	Lemna trisulca	P. zosteriformis
	Myriophyllum exalbescens	Sagittaria sp.
	Potamogeton friesii	*S. cuneata
	P. gramineus	*Typha latifolia
	*P. pectinatus	

---

[1] _Dominant or most abundant species indicated by italics._

* _Specimens which have not been collected._

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed[1]	
Chin Lakes Reservoir (N=10)	Alisma gramineum *Chara sp. Elodea canadensis *Myriophyllum exalbescens *Potamogeton friesii	*P. pectinatus _P. richardsonii_ *P. vaginatus *P. zosteriformis _Ranunculus circinatus_
Cold Lake (N=14)	*Chara sp. Ceratophyllum demersum *Lemna trisulca Myriophyllum exalbescens *Potamogeton natans *P. pectinatus P. pusillus	_P. richardsonii_ P. vaginatus P. zosteriformis _Ranunculus sp._ *Sagittaria sp. *Scirpus sp. *Typha latifolia
Cooking Lake (N=3)	*Juncus sp. *Scirpus sp.	*Typha latifolia
Crimson Lake (N=17)	Chara sp. Equisetum fluviatile E. palustre *Juncus sp. _Myriophyllum exalbescens_ Najas flexilis Nuphar sp. *Polygonum natans Potamogeton gramineus	_P. natans_ (P. pectinatus) P. praelongus P. pusillus P. richardsonii P. zosteriformis Sagittaria sp. *Scirpus sp. *Typha latifolia
Cross Lake (N=10)	*_Ceratophyllum demersum_ *Lemna minor *L. trisulca *_Myriophyllum exalbescens_ *Nuphar sp. *Potamogeton richardsonii	*P. vaginatus *P. zosteriformis *(Ranunculus sp.) *Scirpus sp. *Typha latifolia
Crowsnest Lake (N=0)	None	
Dillberry Lake (N=9)	*Chara sp. *Juncus sp. *Myriophyllum exalbescens *_Potamogeton pectinatus_ *P. praelongus	*P. richardsonii P. vaginatus *P. zosteriformis *Scirpus sp.
Elkwater Lake (N=16)	+(Callitriche hermaphroditica) Ceratophyllum demersum Equisetum fluviatile *Juncus sp. Lemna minor L. trisulca Myriophyllum exalbescens Polygonum natans +Potamogeton friesii	P. pectinatus P. pusillus _P. richardsonii_ P. vaginatus *(Ranunculus sp.) Sagittaria sp. *Scirpus sp. *Typha latifolia Utricularia vulgaris

---

[1] _Dominant or most abundant species indicated by italics._

* _Specimens which have not been collected._

+ _Identification not positive._

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed[1]	
Garner Lake (N=10)	Chara sp. *Lemna trisulca _Myriophyllum exalbescens_ Phragmites communis Potamogeton pectinatus	P. richardsonii _P. vaginatus_ *Ruppia sp. *Scirpus sp. *Typha latifolia
Glenmore Reservoir (N=8)	Elodea canadensis Hippuris vulgaris Myriophyllum exalbescens Potamogeton pectinatus	P. praelongus *P. pusillus _P. richardsonii_ P. vaginatus
Gooseberry Lake (N=2)	*Potamogeton pectinatus *_P. vaginatus_	
Gull Lake (N=6)	*Juncus sp. Myriophyllum exalbescens Potamogeton pectinatus	_P. vaginatus_ *Scirpus sp. *Typha latifolia
Island Lake (N=2)	*Equisetum palustre *Juncus sp.	
Isle Lake (N=14)	*_Ceratophyllum demersum_ *Lemna minor *L. trisulca _Myriophyllum exalbescens_ *Nuphar variegatum *Potamogeton pectinatus *P. pusillus	*P. richardsonii *P. zosteriformis *Ranunculus circinatus *Sagittaria sp. *Scirpus sp. Spirodela polyrhiza *Typha latifolia
Jack Fish Lake (N=4)	*Myriophyllum exalbescens *Nuphar sp.	*P. richardsonii *P. zosteriformis
Keho Lake (N=8)	*Alisma gramineum *Equisetum palustre *Juncus sp. Myriophyllum exalbescens *(Potamogeton pectinatus) *(P. praelongus)	_P. richardsonii_ P. vaginatus *Ranunculus sp. *Sagittaria sp. *(Zannichellia palustris)
Lac La Biche (N=13)	*Ceratophyllum demersum *Elodea canadensis *Equisetum palustre *Lemna minor *Myriophyllum exalbescens *Potamogeton pectinatus *P. richardsonii	*P. vaginatus *Ranunculus sp. *Scirpus sp. *Sparganium sp. *Spirodela polyrhiza *Typha latifolia
Lac La Nonne (N=13)	Ceratophyllum demersum Lemna minor _L. trisulca_ Myriophyllum exalbescens Phragmites communis Potamogeton pectinatus _P. richardsonii_	P. vaginatus P. zosteriformis +Sagittaria latifolia *Scirpus sp. Spirodela polyrhiza *Typha latifolia

---

[1] _Dominant or most abundant species indicated by italics._

* Specimens which have not been collected.

+ Identification not positive.

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed[1]	
Lac Ste. Anne (N=15)	Ceratophyllum demersum *Juncus sp. *Lemna minor L. trisulca Myriophyllum exalbescens Potamogeton pectinatus P. pusillus P. richardsonii	P. vaginatus *Ranunculus sp. Sagittaria sp. *Scirpus sp. *Sparganium sp. Spirodela polyrhiza *Typha latifolia
Lake Newell (N=17)	Alisma gramineum _Ceratophyllum demersum_ *Chara sp. _Elodea canadensis_ *Juncus sp. Lemna trisulca Myriophyllum exalbescens Polygonum natans +Potamogeton friesii (P. gramineus)	*P. pectinatus P. pusillus P. richardsonii P. vaginatus P. zosteriformis Ranunculus sp. *(Sagittaria sp.) *Scirpus sp. *Typha latifolia
Little Fish Lake (N=1)	*_Potamogeton vaginatus_	
Long Lake (N=18)	Ceratophyllum demersum *Chara sp. *Equisetum fluviatile E. palustre *Lemna minor L. trisulca Myriophyllum exalbescens Polygonum natans +Potamogeton natans	*P. pusillus P. richardsonii P. vaginatus *P. zosteriformis *Ranunculus sp. +Sagittaria latifolia *Scirpus sp. +*Ruppia sp. *Typha latifolia
McGregor Reservoir (N=14)	*Alisma gramineum Ceratophyllum demersum Elodea canadensis *Juncus sp. Myriophyllum exalbescens Polygonum natans Potamogeton crispus	*P. pectinatus P. richardsonii P. zosteriformis _Ranunculus circinatus_ *Sagittaria sp. *Scirpus sp. *Typha latifolia
Miquelon Lake (N=5)	Juncus sp. Potamogeton pectinatus +_Ruppia maritima_	*Scirpus sp. *Typha latifolia
Moose Lake (N=12)	Ceratophyllum demersum *Chara sp. Lemna minor L. trisulca _Myriophyllum exalbescens_ Potamogeton pectinatus	P. richardsonii P. vaginatus +Ruppia maritima Sagittaria sp. *Scirpus sp. *Typha latifolia

---

[1] _Dominant or most abundant species indicated by italics._

* Specimens which have not been collected.

+ Identification not positive.

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed[1]	
Muriel Lake (N=16)	Ceratophyllum demersum *Chara sp. Hippuris vulgaris Lemna minor L. trisulca Myriophyllum exalbescens Polygonum natans *(Potamogeton pectinatus) P. pusillus	*P. richardsonii _P. vaginatus_ Ruppia sp. Sagittaria sp. *Scirpus sp. *Typha latifolia Utricularia vulgaris +Vallisneria americana
Park Lake (N=12)	Ceratophyllum demersum *Chara sp. *Juncus sp. Myriophyllum exalbescens Najas flexilis _Potamogeton pectinatus_ _P. praelongus_	P. pusillus _P. richardsonii_ *P. vaginatus P. zosteriformis *(Sagittaria sp.) *Typha latifolia
Pigeon Lake (N=13)	Ceratophyllum demersum *Juncus sp. *Lemna minor *L. trisulca Myriophyllum exalbescens *Najas flexilis Potamogeton gramineus	P. pectinatus _P. richardsonii_ P. vaginatus Sagittaria sp. *Scirpus sp. Utricularia vulgaris
Pine Lake (N=7)	Ceratophyllum demersum *(Elodea canadensis) Lemna trisulca _Myriophyllum exalbescens_ (Potamogeton pectinatus)	_P. richardsonii_ P. vaginatus *Scirpus sp. *Typha latifolia
Police Lake (N=9)	*Chara sp. Myriophyllum exalbescens *Polygonum natans Potamogeton pectinatus P. pusillus	P. richardsonii _P. vaginatus_ P. zosteriformis *Scirpus sp.
Reesor Reservoir (N=14)	+Callitriche heterophylla *C. hermaphroditica _Ceratophyllum demersum_ (Elodea sp.) *Lemna minor Limosella aquatica *Myriophyllum exalbescens *Polygonum natans	+*Potamogeton friesii *(P. natans) P. pectinatus P. pusillus *P. richardsonii *_Ranunculus circinatus_ Sagittaria sp. *Typha latifolia
St. Mary Reservoir (N=6)	*Chara sp. *Juncus sp. Myriophyllum exalbescens	Potamogeton pectinatus P. pusillus _P. richardsonii_

---

[1] _Dominant or most abundant species indicated by italics._

* _Specimens which have not been collected._

+ _Identification not positive._

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed[1]	
Skeleton Lake (N=14)	Ceratophyllum demersum	P. pusillus
	*Chara sp.	*P. richardsonii
	*Lemna minor	P. zosteriformis
	L. trisulca	Ranunculus sp.
	Myriophyllum exalbescens	Ruppia maritima
	Potamogeton pectinatus	Sagittaria cuneata
	*P. praelongus	*Scirpus sp.
Spruce Coulee Reservoir (N=16)	*Alisma gramineum	*Myriophyllum exalbescens
	*Callitriche sp.	*Polygonum natans
	*Chara sp.	*(Potamogeton pectinatus)
	*Equisetum fluviatile	*P. richardsonii
	E. palustre	*Ranunculus circinatus*
	Hippuris vulgaris	*Sagittaria sp.
	*Isoetes sp.	*Typha latifolia
	*Juncus sp.	+*Vallisneria americana
	*Lemna minor	
Sylvan Lake (N=9)	*Chara sp.	*P. richardsonii*
	Hippuris vulgaris	P. vaginatus
	(Lemna minor)	Sagittaria sp.
	Myriophyllum exalbescens	*Scirpus sp.
	Potamogeton pectinatus	*Typha latifolia
Thunder Lake (N=20)	*Ceratophyllum demersum	P. pectinatus
	*Chara sp.	P. pusillus
	Equisetum fluviatile	P. richardsonii
	E. palustre	*P. vaginatus
	*Juncus sp.	P. zosteriformis
	*Lemna minor	Sagittaria sp.
	Myriophyllum exalbescens	*Scirpus sp.
	Nuphar variegatum	Spirodela polyrhiza
	Polygonum natans	*Typha latifolia
	+Potamogeton friesii	Utricularia vulgaris
Travers Reservoir (N=9)	*(Alisma gramineum)	*Potamogeton pectinatus
	Ceratophyllum demersum	*P. richardsonii*
	*Chara sp.	*P. zosteriformis
	Elodea canadensis	*Ranunculus circinatus
	Myriophyllum exalbescens	*Typha latifolia
Twin Lakes (N=15)	*Chara sp.	P. praelongus
	Equisetum fluviatile	(P. pusillus)
	Hippuris vulgaris	P. richardsonii
	Myriophyllum exalbescens	Sagittaria sp.
	Nuphar variegatum	*Scirpus sp.
	Polygonum natans	Sparganium sp.
	Potamogeton gramineus	*Typha latifolia
	P. natans	Utricularia vulgaris

---

[1] *Dominant or most abundant species indicated by italics.*

* *Specimens which have not been collected.*

+ *Identification not positive.*

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed[1]	
Wabamun Lake (N=21)	Ceratophyllum demersum	*P. praelongus
	*Chara sp.	P. pusillus
	Elodea canadensis	*P. richardsonii*
	Hippuris vulgaris	P. vaginatus
	Lemna trisulca	P. zosteriformis
	Myriophyllum exalbescens	Ranunculus circinatus
	Najas flexilis	+Ruppia sp.
	*Nuphar sp.	Sagittaria sp.
	+Potamogeton friesii	*Scirpus sp.
	(Potamogeton natans)	*Typha latifolia
	P. pectinatus	Utricularia vulgaris
Waterton Reservoir (N=2)	*(Juncus sp.)	
	*(Scirpus sp.)	
Wizard Lake (N=18)	Ceratophyllum demersum	P. praelongus
	*Juncus sp.	P. richardsonii
	Lemna trisulca	+*P. strictifolius
	Myriophyllum exalbescens	P. vaginatus
	Nuphar variegatum	P. zosteriformis
	Nymphaea sp.	Sagittaria sp.
	*Phragmites communis	*Scirpus sp.
	Potamogeton friesii	*Sparganium eurycarpum
	P. pectinatus	*Typha latifolia

---

[1] *Dominant or most abundant species indicated by italics.*

* *Specimens which have not been collected.*

+ *Identification not positive.*

diversity of species (21) was observed at Wabamun Lake. *Potamogeton richardsonii* (Benn.) Rydb. and *Myriophyllum exalbescens* Fern. were the most abundant species in this lake. Other lakes which demonstrated high species diversity were Thunder Lake (20 spp.), Beauvais Lake (18 spp.), Long Lake (18 spp.), Wizard Lake (18 spp.), Crimson Lake (17 spp.), and Lake Newell (17 spp.).

The lowest species diversity (zero spp.) was noted at Crowsnest Lake. The absence of observed aquatic plant growth in Crowsnest Lake may be attributed to its rocky substrate and rapid drop offs, neither characteristic being conducive to aquatic plant growth. Serious weed infestations within this lake are unlikely. Island Lake, just upstream of Crowsnest Lake also demonstrated low species diversity (two spp.). Boating activity in Island Lake is common. This activity, coupled with the lake's proximity to British Columbia and its location along a major east-west highway route make it a likely site for the accidental introduction of *Myriophyllum spicatum* L. An introduction of *M. spicatum*, to Island Lake, could result in its spread (by plant fragments) throughout most of the Oldman River system.

The dominant or most abundant species within each water body also is indicated in Table 3. *Potamogeton richardsonii* was dominant or most abundant in 15 water bodies while *Myriophyllum exalbescens* was dominant in 11 water bodies. Despite being present in 31 water bodies, *Potamogeton pectinatus* L. only was considered dominant in three.

The occurrence of aquatic plant species in Alberta lakes and reservoirs surveyed during 1983 is summarized in Table 4. Eurasian water milfoil was not found within any of the water bodies surveyed. However, the genus *Myriophyllum* (water milfoil) was represented by *M. exalbescens* Fern. at 38 of the 47 water bodies surveyed. *Potamogeton*

Table 4: Occurrence of Aquatic Plants in Alberta Lakes and Reservoirs Surveyed During 1983. (N=47)[1]

Species[2] or Genus	Number of Lakes and Reservoirs in Which Species or Genus Occurred																												
	1	2	3	4	5	6	7	8	9	--	13	14	15	16	17	18	19	20	21	22	23	--	28	29	30	31	--	37	38
M. exalbescens																													*(38)
P. richardsonii																												*(37)	
P. pectinatus																										*(31)			
T. latifolia																									*(30)				
Scirpus sp.																								*(29)					
P. vaginatus																							*(28)						
C. demersum																					*(23)								
Sagittaria sp.																					*(23)								
Juncus sp.																				*(22)									
P. zosteriformis																			*(21)										
Chara sp.																			*(21)										
P. pusillus																	*(19)												
L. trisulca															*(17)														
Ranunculus sp.														*(16)															
L. minor												*(14)																	
Polygonum natans											*(13)																		
Potamogeton praelongus									*(9)																				
E. canadensis								*(8)																					
Nuphar sp.								*(8)																					
Utricularia vulgaris								*(8)																					
E. palustre							*(7)																						
H. vulgaris							*(7)																						
P. friesii							*(7)																						
A. gramineum						*(6)																							
E. fluviatile						*(6)																							
Ruppia sp.						*(6)																							
Potamogeton natans						*(6)																							
Sparganium sp.					*(5)																								
N. flexilis				*(4)																									
S. polyrhiza				*(4)																									
Phragmites communis			*(3)																										
P. gramineus			*(3)																										
Callitriche sp.		*(2)																											
V. americana		*(2)																											
Isoetes sp.	*(1)																												
L. aquatica	*(1)																												
Nymphaea sp.	*(1)																												
P. strictifolious	*(1)																												

---

[1] Total number of lakes and reservoirs surveyed.

[2] Refer to Table 2 for complete genus name.

richardsonii was found in 37 lakes and reservoirs. Other submergent species commonly observed were *Potamogeton pectinatus* (31), *P. vaginatus* Turcz. (28) and *Ceratophyllum demersum* L. (23). The most abundant emergent species were *Typha latifolia* L., *Scirpus* sp., and *Sagittaria* sp. which were observed in 30, 29 and 23 water bodies respectively.

Further details regarding survey results and descriptions of survey sites is discussed for each water body in Section 3.1.

3.1 SITE DESCRIPTIONS

1. LAC LA BICHE (Figure 4)

Date: August 25, 1983

* Site 1. East end of the lake, Sir Winston Churchill Provincial Park boat launch and adjacent shore area. Launch - four cement slabs wide. A few small "clumps" of *Myriophyllum exalbescens* Fern. and *Potamogeton pectinatus* L. were growing around launch area and dock, but no plants were surfacing. Most other species were observed in the form of fragments. A heavy algal bloom was occurring; water visibility was approximately 20 cm (foul odor prevalent).

2. SKELETON LAKE (Figure 5)

Date: August 26, 1983

Site 1. South-east corner of the lake. Boat launches, docks and pier present at Skeleton Lake Resort. Many dense "clumps" of *M. exalbescens* were growing around the pier and throughout most of bay area. *Ranunculus circinatus* Sibth. also was abundant (more than observed in the 1982 survey). Other species present include *Potamogeton pectinatus* L. and *Ruppia maritima* L. The Resort operator stated that the aquatic weed growth was considerably worse this year than in the past.

Site 2. East end, gravel boat launch at public access near golf course. The launch and picnic facilities were well maintained. *M. exalbescens* was very abundant; a dense band was along the shore perimeter. *Sagittaria* sp. also was abundant. A *Scirpus* sp. bed was observed west of the launch. Weed growth was at nuisance levels.

---

* See Maps (Appendix 1) for site locations.

3. CROSS LAKE (Figure 6)

Date: August 23, 1983

* Site 1. West shore, provincial park boat launch and beach area. A single *Potamogeton richardsonii* (Benn.) Rydb. plant was found growing at the launch site. *Lemna trisulca* L. also was present. Numerous fragments were on the shore, including *M. exalbescens* and *Ceratophyllum demersum* L. The inshore substrate was sand-gravel; sand-silt was further off shore. Absence of significant weed beds possibly due to presence of dense filamentous algal growth.

Site 2. West end outflow channel area near bridge crossing. *M. exalbescens* and *C. demersum* were abundant. Substrate was mud.

4. LONG LAKE (Figure 7)

Date: August 26, 1983

Site 1. West shore, provincial park boat launch and picnicking area, has two double cement slab width launches. A large bed of *Sagittaria* sp. was surfacing on the south side of the launch. Other rooted species present include *Equisetum palustre* L., *Potamogeton zosteriformis* Fern., *P. richardsonii* and *M. exalbescens*. Large *Scirpus* sp. beds were observed south of the launch. Weed growth at launches was below nuisance levels.

Site 2. West shore, day use and bay area south of site 1. A small inflow stream (very cold) was present adjacent to the small beach. Although weed growth was not particularly dense, species diversity was relatively high. Species present included *M. exalbescens*, *Ranunculus* sp., *Equisetum fluviatile* L., *Polygonum natans* Eaton and *Ceratophyllum demersum*.

Site 3. West shore, provincial park boat rental service and day use area (was site #2 in 1982 survey). Aquatic weed growth in the bay and dock area was sparse. Species present included *M. exalbescens*, *P. vaginatus* Turcz., *P. richardsonii*, and *Sagittaria* sp.

No clearly dominant species was observed at any of the three sites.

5. COLD LAKE (Figure 8)

Date: August 25, 1983

* See Maps (Appendix 1) for site locations.

5. COLD LAKE (Figure 8) continued....

* Site 1. South-west shore, Cold Lake Provincial Park boat launch and wharf area. The launch is a double width cement slab with a portable wharf on each side. A dense bed of *Ranunculus* sp. and *Potamogeton richardsonii* was observed on west side of the launch area. Very sparse growth was observed off shore of the launch itself. *P. richardsonii* also was abundant on the east side of the launch. Other species included *M. exalbescens* (very few), *Potamogeton pusillus* L., *P. zosteriformis* and *Sagittaria* sp. Substrate was rock and gravel.

Site 2. Town of Cold Lake, boat launch and large pier area with breakwater. Dense weed growth (many plants were surfacing) in the sheltered side of the breakwater. *P. richardsonii* was most abundant. Other species observed included *M. exalbescens*, *P. pusillus*, *P. vaginatus* and *Ranunculus* sp. Launch area was weed free. Substrate was sand-gravel.

Site 3. West shore, provincial park campground boat launch at English Bay. With the exception of *Chara* sp., only a few fragments were visible. A sandy beach was located on the north side of the launch, rocky shore to the south.

6. MOOSE LAKE (Figure 9)

Date: August 24, 1983

Site 1. North shore, provincial park car-topper and canoe launch. Water was very shallow around the launch. Very sparse growth was inshore which included *Potamogeton pectinatus*, *P. richardsonii*, *C. demersum*, *Sagittaria* sp. and *M. exalbescens*. Substrate was sand-silt.

Site 2. Provincial park, main boat launch (double width). Well protected bay. Very dense band of *M. exalbescens* was observed (approx. 15 m wide) along the shore on both sides of the launch. Many *M. exalbescens* plants were surfacing and flowering - some were growing in water as shallow as 20 cm. Many rooted plants were observed throughout the bay area, including *Potamogeton pectinatus* and *Ceratophyllum demersum*. *Potamogeton richardsonii* was not observed (it was noted at this site in 1982). Substrate was composed of silt and organic mud.

Site 3. North end, bridge crossing Moose Lake River outflow channel. Water was shallow and turbid. Aquatic weed growth was dense. Species present included *M. exalbescens*, *Potamogeton pectinatus* and *P. richardsonii*.

---

* See Maps (Appendix 1) for site locations.

6. MOOSE LAKE (Figure 9) continued....

* Site 4. Provincial park campground at south-east corner of lake. Boat launch (cement slab) is in poor condition. Private cottages are on both sides of the launch. Sparse aquatic plant growth which included *M. exalbescens*, *P. pectinatus* and *P. richardsonii*. Many *M. exalbescens* fragments were observed on the shore. Clear water and sand-gravel substrate.

7. GARNER LAKE (Figure 10)

Date: August 23, 1983

Site 1. South-east corner, Garner Lake Provincial Park main boat launch. Sparse to moderate aquatic plant growth was observed around the launch and wharf area. Species present included *M. exalbescens*, *P. pectinatus* and *P. richardsonii*.

Site 2. West side of provincial park beach. Large bed of *Potamogeton vaginatus* (approx. 20 m wide) was extending along the shore. Large clumps of filamentous algae were floating on the surface. Dense mats of filamentous algae were found covering the substrate. Sparse *P. pectinatus* and *Lemna trisulca* also were present.

Site 3. Boat launch and dock area at the north end of Garner Lake Provincial Park. Sparse growth included *M. exalbescens*, *P. pectinatus*, *P. richardsonii*, *P. vaginatus* and *Ruppia* sp. Substrate was silt-mud.

Site 4. Large bay on south-west shore. Very dense bed of *M. exalbescens* was observed throughout almost the entire bay area. *Potamogeton pectinatus* and *P. vaginatus* also were present.

Site 5. Large bay midway along west shore. Large beds of *Scirpus* sp. and *Phragmites communis* were observed along the shore. Dense beds of *M. exalbescens* were seen throughout most of inner bay area.

Site 6. East shore (windward shore). Very little filamentous algae growth was observed compared with sites on the west shore (probably due to exposure to wave action). Aquatic plant growth sparse. *Potamogeton vaginatus* is most abundant. Substrate was rock-gravel-sand.

8. MURIEL LAKE (Figure 11)

Date: August 24, 1983

* See Maps (Appendix 1) for site locations.

8. MURIEL LAKE (Figure 11) continued....

* Site 1. South-east corner, public beach and stream inflow channel. Only Chara sp. and sparse growth of Ruppia sp. was observed along the beach area. Large diversity of growth was within the stream inflow channel. Plants observed included Hippuris vulgaris, Ceratophyllum demersum, Polygonum natans and Utricularia vulgaris.

Site 2. South-west corner, public boat launch and beach area. Many private cottages are present just above beach. No rooted aquatic plants were visible (only Chara sp. was observed). Substrate was sand-gravel and stone.

Site 3. Provincial park campground and boat launch north of Gurneyville. No rooted aquatic plants were visible (fragments of P. vaginatus and Ruppia sp. were observed on shore). Substrate was sand-gravel-rock.

9. THUNDER LAKE (Figure 12)

Date: August 18, 1983

Site 1. South shore, provincial park boat launch. Moderate weed growth. Species observed included M. exalbescens, Ceratophyllum demersum, Potamogeton pectinatus and P. zosteriformis. Weed growth here was not considered a nuisance to boating activity.

Site 2. Provincial park beach and boat mooring area. Dense weed growth was present in protected boat mooring bay. Species observed included Nuphar varigatum, Potamogeton pusillus and P. zosteriformis. Aquatic weed growth presents a potential nuisance to boating activity.

Site 3. South-east shore, small bay at Lakeview campsite. Aquatic weed growth was not particularly abundant, but a high diversity of species was present. Species included Equisetum fluviatile, E. palustre, M. exalbescens, Polygonum natans, Potamogeton pusillus, Utricularia vulgaris and Spirodela polyrhiza.

10. LAC LA NONNE (Figure 13)

Date: August 30, 1983

Site 1. South-east shore, public boat launch at county operated campground. Water was shallow and aquatic weed growth was sparse. Lemna trisulca was most abundant. Substrate was silt-mud.

* See Maps (Appendix 1) for site locations.

10. LAC LA NONNE (Figure 13) continued....

* Site 2. South side of lake, shoreline areas adjacent to Kildeer Beach Resort. Large weedbeds were on both sides of the resort (predominantly *M. exalbescens* on the south side and *Potamogeton richardsonii* on the north side). *Potamogeton vaginatus* also was abundant in both areas. Most *M. exalbescens* plants were surfacing, many were in flower and had adventitious roots.

Site 3. Public boat launch at S.W. corner. Large bed of *Potamogeton richardsonii* observed; some plants were surfacing. *Lemna minor* and *L. trisulca* also were abundant. Water was green with algae.

Site 4. North shore, public access and boat launch. Water visibility was very poor; only sparse aquatic weed growth. *Lemna trisulca* was very dense along almost the entire shoreline, particularly the north shore.

- *Phragmites communis* was the dominant emergent species.
- *Potamogeton richardsonii* appeared to be the dominant submergent species.

- In addition to these sites, almost the entire perimeter of the lake was surveyed.

11. LAC STE. ANNE (Figure 14)

Date: August 17, 1983

Site 1. East shore, wooden pier off beach at Alberta Beach townsite. Water depth is very shallow, weed growth sparse. *Potamogeton pectinatus* was the only rooted species observed.

Site 2. East shore, cement-landfill pier and boat launch at Alberta Beach townsite. Sparse growth on sheltered side, elsewhere - weed free. Rooted species in sheltered included *M. exalbescens*, *P. pectinatus*, *P. pusillus*, *P. richardsonii* and *Sagittaria* sp.
Many drifting *M. exalbescens* fragments, almost all with adventitious roots.

Site 3. North-east corner, outflow channel. Sparse but diverse growth within outflow channel. Species included *M. exalbescens*, *Ceratophyllum demersum*, *Potamogeton pectinatus*, *P. richardsonii*, *Sagittaria* sp. and *Typha latifolia*. Current slow.

12. ISLE LAKE (Figure 15)

Date: August 17, 1983

* See Maps (Appendix 1) for site locations.

12. ISLE LAKE (Figure 15) continued....

* Site 1. North-east end, bridge crossing and public boat launch area near Sunny Side Estates. Cement slab launch. Ceratophyllum demersum (dominant) and Lemna minor very abundant. Other species present included Lemna trisulca, Spirodela polyrhiza, Ranunculus circinatus and Potamogeton richardsonii. Only a single M. exalbescens plant was observed at this site.

Site 2. North shore, public boat launch at summer village of South View. Launch (cement slab) well maintained, inshore weed growth was very sparse.

Site 3. North shore, public boat launch near Jones Beach. Appears to see little use, no dock. Very dense aquatic weed growth present, including M. exalbescens, Ceratophyllum demersum, Sagittaria sp., Lemna trisulca and Nuphar sp.

Site 4. North-west end of lake, public boat launch (double width cement slab). Extensive aquatic weed growth on and adjacent to the launch ramp (indicates that launch sees little use). Same species present as noted at Site 3. Very large and expansive bed of M. exalbescens (surfacing) at west end of lake. This weed bed is a serious nuisance with respect to boating activity and navigation.

Site 5. South-west shore of lake, public boat launch at Alberta Transportation maintained campground. Gravel launch appears to see moderate use. Few aquatic plants were observed inshore. Species noted were M. exalbescens and Potamogeton pectinatus. Inshore substrate was composed of sand-gravel. This site is exposed to winds from the west.

13. WABAMUN LAKE (Figure 16)

Date: August 16, 1983

Site 1. Wabamun Lake Provincial Park boat launch and dock area. Aquatic plant growth was very similar to that observed in 1982. Abundant M. exalbescens growth was present between the two piers. Lemna trisulca, Elodea canadensis and Potamogeton zosteriformis also were abundant. Growth of submergent species extends throughout littoral area; sand silt substrate.

---

* See Maps (Appendix 1) for site locations.

13. WABAMUN LAKE (Figure 16) continued....

* Site 2. Public pier and boat launch at town of Wabamun. Well maintained launch, water shallow; silt-mud substrate. Aquatic plant growth on west side of pier was quite dense. No clearly dominant species. *M. exalbescens* and *Potamogeton richardsonii* were most abundant. Other species present included *Potamogeton zosteriformis*, *P. praelongus*, *P. pectinatus* and *Utricularia vulgaris*.

Site 3. Channel on west side of Point Alison leading to Power Generating Plant west of Wabamun townsite. Sparse growth included *Hippuris vulgaris* and *M. exalbescens*.

Site 4. West end, Seba Beach public pier and private dock facilities. *Potamogeton richardsonii* (dominant) and *P. pectinatus* abundant along both sides of pier. Many *P. pectinatus* plants with seeds present, some extending into water as shallow as 0.3 metres. *Ceratophyllum demersum*, *Najas flexilis* and *M. exalbescens* were also present in small quantities.
Dense growth of *P. pectinatus* and *Ranunculus circinatus* at private dock facilities.

14. COOKING LAKE (Figure 17)

Date: August 3, 1983

Site 1. South-west shore, public boat launch at town of Cooking Lake. Water was extremely turbid due to heavy algal bloom. No surfacing weed beds were noted. Extremely limited visibility made it difficult to locate submergent species. Emergent growth included *Juncus* sp., *Typha latifolia* and *Scirpus* sp.
Recreational use of lake is very minimal.

15. MIQUELON LAKE (Figure 18)

Date: August 3, 1983

Site 1. East shore, provincial park boat launch. Although weed growth was not dense, *Ruppia* sp. (dominant) and *Potamogeton pectinatus* are present throughout littoral area in scattered clumps. No surfacing or nuisance growth observed.

Site 2. South shore, provincial park boat launch. Dense bed of *Ruppia* sp. were observed throughout inshore areas to depths of 3 m. No surfacing or nuisance growth present. Water very alkaline, very few submergent aquatic plant species were present.

---

* See Maps (Appendix 1) for site locations.

16. WIZARD LAKE (Figure 19)

Date: July 19, 1983

* Site 1. North-east shore, packed gravel boat launch at Jubilee Park. No rooted aquatic plants were observed, only a few fragments on shore. Coarse gravel-rock substrate.

Site 2. North shore, cottage area west of Site 1. Silt-mud sediment close to shore. Dense aquatic weed growth in bands approximately 10 m wide along shoreline (_M. exalbescens_ dominant). Other species present included _Potamogeton richardsonii_, _P. praelongus_ and _P. zosteriformis_.
Weed growth is at nuisance levels.

Site 3. North shore, shoreline adjacent to small farm. Cattle and livestock stalls extend down embankment to waters edge. Large _Nuphar variegatum_ bed (in flower) just off shore. _M. exalbescens_ growth was also very dense.

Site 4. North-west corner of lake, public boat launch. Appears to see only limited use. Large beds of _Nuphar variegatum_ and _Typha latifolia_ throughout west end. Sparse submergent weed growth at launch included _M. exalbescens_, _Ceratophyllum demersum_ and _Lemna trisulca_.

Site 5. South-west corner of lake, public boat launch. Composition and distribution of aquatic plant species quite different than sites on north shore. A dense band of _Nuphar variegatum_ (5-10 m wide) extends along virtually the entire south shore.

Site 6. South-east shore, adjacent to cottage area. A very large and dense bed of _M. exalbescens_ was observed here. Most plants were flowering and had pink stems. The weed bed was surfacing and had formed dense floating mats, resulting in a considerable nuisance to boat navigation.

17. PIGEON LAKE (Figure 20)

Date: August 3, 1983

Site 1. East shore, Mulhurst public boat launch and lake access area. Launch has been upgraded since 1982, approach is no longer as steep. No rooted aquatic plants were observed. Fragments present included _Potamogeton richardsonii_, _Najas flexilis_ and _M. exalbescens_. Substrate consists of rock-gravel.

* See Maps (Appendix 1) for site locations.

17. PIGEON LAKE (Figure 20) continued....

* Site 2. Ma-Me-O Beach, public beach and cement-lined pier area. Very sparse aquatic plant growth. Only a few fragments on shore, including *M. exalbescens*. Water is shallow, sand substrate.

Site 3. West shore, Pigeon Lake Provincial Park, boat launch and pier area. Water visibility was poor due to exposure to wave action. Few rooted plants. Aquatic vegetation consisted of *Potamogeton gramineus* and *P. richardsonii*. Fragments of *M. exalbescens* were observed on shore and drifting in the water.

Site 4. North-west corner, bridge crossing small inflow channel near Fisher Home. Large quantities of *Lemna minor*. Other aquatic macrophyte species present included *Nuphar* sp., *Utricularia vulgaris*, *M. exalbescens* and *Sagittaria* sp.

Site 5. North-west corner, Zeiner Park. Boat launch was closed due to disrepair. Water was very shallow, sand-silt substrate. Abundant aquatic vegetation included *Potamogeton richardsonii* (dominant), *P. pectinatus*, *Ceratophyllum demersum* and *M. exalbescens*. Large *Scirpus* sp. bed north-east of launch area.

18. BUCK LAKE (Figure 21)

Date: August 8, 1983

Site 1. South-west corner, Alberta Transportation operated campsite and boat launch area. A large bed of *Ranunculus* sp., *Sagittaria* sp. and *Nuphar* sp. was observed just south of the boat launch. Abundant aquatic plant growth occurred throughout much of the lake's south end; water shallow.
Area appears to receive moderate recreational use.

19. GULL LAKE (Figure 22)

Date: August 10, 1983

Site 1. North-west shore, Birch Bay boat launch and dock area. No problem weed beds. Sparse aquatic plant growth included *Potamogeton pectinatus*, *P. vaginatus* and *Typha latifolia*. Silt-clay substrate.

---

* See Maps (Appendix 1) for site locations.

19. GULL LAKE (Figure 22) continued....

* Site 2. South end, Aspen Beach Provincial Park boat launch and swimming area. Water shallow, poor visibility. Sparse growth around the launch area and wharf. *Potamogeton vaginatus* most abundant, *M. exalbescens* present in isolated clumps (some with adventitious roots). Other species present included *P. pectinatus* and *Elodea canadensis*.
A very dense and expansive bed of *M. exalbescens* was noted in small bay west of the boat launch. Most plants were surfacing and some in flower.
On a return visit (October 24, 1983) this weed bed was still surfacing and winter turions had formed.

20. BUFFALO LAKE (Figure 23)

Date: August 11, 1983

Site 1. West end, narrows campground. Dense aquatic plant growth throughout much of the narrows. *Lemna trisulca* and *M. exalbescens* were very abundant. *Potamogeton pusillus* and *P. vaginatus* also present.

Site 2. South shore, Rochon Sands Provincial Park boat launch and privately operated marina. Water is very shallow, aquatic plant growth was abundant throughout bay (approaching nuisance levels), none surfacing. Aquatic vegetation consisted of *Potamogeton pectinatus*, *P. vaginatus* and *Ruppia* sp. Silt-mud substrate.

Site 3. North shore, Pelican Point public boat launch and adjacent private marina and boat launch facility. Abundant aquatic plant growth around dock areas included *Ruppia maritima*, *Potamogeton pectinatus* and *P. vaginatus*. Plants were not surfacing nor considered a nuisance.

Site 4. East shore, public campground and day use facilities. No rooted aquatic plants were noted. Many fragments of *Ruppia* sp. and *Potamogeton vaginatus*. Sand substrate. Area is exposed to wind and wave action from the west.

21. JACK FISH LAKE (Figure 24)

Date: August 9, 1983

Site 1. East end, Alberta Forestry Service operated campground and boat launch facility. Many aquatic plants were present including *Potamogeton richardsonii*, *P. zosteriformis*, *Nuphar* sp. and *M. exalbescens*.
Despite small size of lake and campground area, this lake warrants surveys due to its close proximity to B.C. and its location along a major east-west highway route.

* See Maps (Appendix 1) for site locations.

22. CRIMSON LAKE (Figure 25)

Date: August 9, 1983

* Site 1. South shore, provincial park main boat launch and dock area. Flocculent silt-mud substrate. Sparse aquatic plant growth adjacent to launch. *M. exalbescens* and *Potamogeton pusillus* were most abundant. *M. exalbescens* plants were small and clustered. No nuisance growth was observed.

Site 2. South shore, provincial park car-topper and canoe launch. Water is very shallow, visibility was poor. Sparse aquatic plant growth consisted of *M. exalbescens* and *Potamogeton richardsonii*.

In addition to the main sites above, the total perimeter of the lake was surveyed. Almost the entire lake is littoral allowing both abundant and diverse aquatic macrophyte growth. *Potamogeton natans* and *M. exalbescens* are particularly abundant and widespread. In many areas *M. exalbescens* is present in dense clumps, indicating pioneer infestations and potential for further increase and spread. *Potamogeton praelongus* was abundant in deeper waters.

23. TWIN LAKES (Figure 26)

Date: August 9, 1983

Site 1. East shore, provincial park boat launch and dock area. Substrate was very flocculent (white ash-like). Yellow waterlily (*Nuphar variegatum*) abundant, growth of other aquatic plant species was sparse at this site. Species consisted of *Potamogeton gramineus*, *P. richardsonii* and *P. praelongus*. Water is shallow but very clear.

Site 2. North shore, small point. Water depth increases quickly off shore. Aquatic plant growth was diverse but sparse. Species present included *Potamogeton natans*, *P. gramineus*, *P. praelongus*, *Polygonum natans*, *Utricularia vulgaris* and *Equisetum fluviatile*. *M. exalbescens* was NOT noted (was observed in 1982).

Site 3. South shore, abundant weed growth in small bay with intermittent inflow stream. *Hippuris vulgaris* was dominant. Other species included *Utricularia vulgaris* and *M. exalbescens*.

24. SYLVAN LAKE (Figure 27)

Date: August 10, 1983

---

* See Maps (Appendix 1) for site locations.

24. SYLVAN LAKE (Figure 27) continued....

* Site 1. South shore, Willies Marine. Water was very turbid due to boating activity. Sparse rooted growth consisted of Potamogeton pectinatus and P. richardsonii. Mud substrate.

Site 2. South shore, Sylvan Lake Provincial Park boat launch, pier and surrounding beach area. Water clear, only sparse rooted plant growth of P. pectinatus and P. richardsonii was observed. Fragments of M. exalbescens common.

Site 3. North end, Sunhaven day use park boat launch at Glen's Cove. Large Scirpus sp. and Typha latifolia bed on north side of launch. Growth of submergent species was sparse; species present consisted of Potamogeton richardsonii, P. vaginatus, Hippuris vulgaris and Sagittaria sp.

- A very large number of M. exalbescens fragments (many with adventitious roots) were observed lying on substrate. May indicate a major increase in M. exalbescens in 1984.

25. DILLBERRY LAKE (Figure 28)

Date: June 27, 1983

Site 1. West shore, Dillberry Lake Provincial Park boat launch and beach area. Fine sand beach on west side of boat launch, many private cottages adjacent to beach area. Sparse submergent growth consisted of Potamogeton pectinatus (most abundant), P. richardsonii and P. zosteriformis. Fragments of P. praelongus and M. exalbescens also were present. No nuisance weed beds were observed.

- Park appears to be utilized heavily by Saskatchewan residents. In the event of an Eurasian water milfoil infestation, this lake would be a prime site for its dispersal into Saskatchewan waters.

26. GOOSEBERRY LAKE (Figure 29)

Date: June 27, 1983

Site 1. North-west shore, Gooseberry Lake Provincial Park boat launch and dock facilities. Two launch areas (both sand-gravel) present, each has small pier. Aquatic vegetation consisted of Potamogeton pectinatus and P. vaginatus. Many fragments on shore. Water is very shallow. Sand-mud substrate.

* See Maps (Appendix 1) for site locations.

27. PINE LAKE (Figure 30)

Date: August 12, 1983

* Site 1. North end, Leisure Campground Resort area and adjacent public day use and boat launch facility. _Lemna trisulca_ was very abundant. Rooted aquatic vegetation included _M. exalbescens_, _Potamogeton richardsonii_, _P. vaginatus_ and _Ceratophyllum demersum_. Many fragments on day use beach area. No surfacing or nuisance growth was observed. Water visibility was poor at resort docks due to boating activity.

Site 2. West shore, Sandy Cove Resort boat launch and dock area. Area almost void of aquatic vegetation. A few small _P. richardsonii_ plants were growing adjacent to launch. Fragments of _P. vaginatus_ and _M. exalbescens_ were abundant. Beach area was free of fragments (apparently due to periodic cleanup by resort staff).

Site 3. West shore, Millers Landing Resort boat launch and dock. Water is very shallow, dense growth of _P. richardsonii_ present throughout most of bay area. Silt-mud substrate.

28. LITTLE FISH LAKE (Figure 31)

Date: June 28, 1983

Site 1. East shore, Little Fish Lake Provincial Park boat launch, beach and adjacent shore areas. Very few rooted aquatic plants inshore, many fragments on shore (_P. vaginatus_). Water is very shallow, greatest depth approximately 5 m. Filamentous green algae abundant. Gravel-stone substrate.

29. GLENMORE RESERVOIR (Figure 32)

Date: July 15, 1983

Site 1. South shore, Glenmore Yacht Club boat launch and dock facilities. Water was very clear. Only sparse aquatic macrophyte growth in vicinity of yacht club. _Potamogeton richardsonii_ was only rooted species noted. Numerous fragments of _P. vaginatus_, _Elodea canadensis_ and _Hippuris vulgaris_ were observed on shore and drifting in the water.

Site 2. East shore, Heritage Park Marina boat launch and dock facilities. Dense submergent growth around inner dock area. _M. exalbescens_ (not present at Site 1) was most abundant. Other rooted species included _Hippuris vulgaris_, _Potamogeton pectinatus_, _P. praelongus_, _P. pusillus_ and _P. richardsonii_. No surfacing weeds observed. Sand-silt substrate.

* See Maps (Appendix 1) for site locations.

29. GLENMORE RESERVOIR (Figure 32) continued....

NOTE: Swimming and the use of power boats within Glenmore Reservoir is strictly prohibited.

30. CHESTERMERE LAKE (Figure 33)

Date: July 25, 1983

* Site 1. North end, boat launch and wharf area. Dense aquatic macrophyte growth throughout almost entire area north of causeway. Potamogeton richardsonii dominant and Ceratophyllum demersum also was abundant. Other species included Potamogeton zosteriformis and P. vaginatus. No M. exalbescens was observed.

Site 2. East shore, just south of causeway. Dense beds of P. richardsonii and C. demersum. Some plants were surfacing.

Site 3. South-east corner, small spillway and flow control structure. Strong current towards spillway, P. vaginatus abundant here. P. richardsonii dominant further out. Many plants were surfacing.

31. MCGREGOR RESERVOIR (Figure 34)

Date: June 21, 1983

Site 1. North end, Milo Memorial Park gravel boat launch area. No pier, docks or wharf present, launch area void of aquatic plant growth. Water shallow, muddy shoreline. Large bed of Ranunculus circinatus (surfacing and in flower) and Potamogeton crispus just north of launch area. Other aquatic plant species present included Elodea canadensis and P. pectinatus. With exception of R. circinatus, most plants were immature. Many shorebirds were present in this area.

Site 2. North and south shore of causeway (highway #531 crossing). Aquatic plant growth dense in almost all inshore areas. Ranunculus circinatus was dominant. Most R. circinatus plants were surfacing and in flower, many with long adventitious roots. Other aquatic plant species present included Elodea canadensis, Ceratophyllum demersum, Potamogeton richardsonii, P. zosteriformis and M. exalbescens. No P. crispus was noted at this site.

32. LAKE NEWELL RESERVOIR (Figure 35)

Date: July 26, 1983

* See Maps (Appendix 1) for site locations.

32. LAKE NEWELL RESERVOIR (Figure 35) continued....

* Site 1. Boat launch and bay area on west side of Kinbrook Island Provincial Park. *Elodea canadensis* and *Potamogeton pusillus* were abundant in sheltered areas. Very sparse growth in areas exposed to wave action. *Potamogeton gramineus* and *Sagittaria* sp. (both observed in 1982) were not noted during this survey. Distribution and density of aquatic plant species otherwise was very similar to that observed in 1982.

Site 2. Shallow bay and marsh area on east side of Kinbrook Island. *Polygonum natans* (terrestrial form) abundant on shore. Dense aquatic macrophyte growth throughout the bay area, *Ceratophyllum demersum* and *Ranunculus* sp. (dominant) were very dense. Many *Ranunculus* sp. plants were surfacing and in flower. *Lemna trisulca* also was very abundant (completely covering substrate). Other species included *Elodea canadensis* and *M. exalbescens*.

33. CHAIN LAKE RESERVOIR (Figure 36)

Date: July 11, 1983

Site 1. South-east end of reservoir, north of provincial park boat launch and dock. Only sparse aquatic plant growth present composed of *Potamogeton pectinatus* and *P. richardsonii*.

Site 2. Small bay on south side of provincial park boat launch and dock. Dense bed of *P. richardsonii* (dominant), *P. pectinatus* and *Ceratophyllum demersum* were also present.

Site 3. South end, sheltered bay near outflow channel. Sparse aquatic plant growth but high species diversity. Aquatic plant species present included *Hippuris vulgaris*, *Potamogeton pectinatus*, *P. pusillus*, *P. richardsonii*, *Ceratophyllum demersum*, *M. exalbescens*, *Sagittaria* sp. and *Utricularia vulgaris*.

Site 4. Large bay at south-west end of lake. Dense weed growth was present throughout most of bay area. *P. pusillus* (dominant), *P. richardsonii* and *P. natans* were very abundant. Many plants were surfacing, making boat navigation difficult. Other species present included *Alisma gramineum*, *M. exalbescens* and *Ranunculus* sp.

- Observation of Site 5 (surveyed in 1982) was discontinued due to sparse aquatic plant growth.

34. TRAVERS RESERVOIR (Figure 37)

Date: June 21, 1983

* See Maps (Appendix 1) for site locations.

34. TRAVERS RESERVOIR (Figure 37) continued....

* Site 1. East end, bottom of spillway below dam. Water was very clear; aquatic plant growth was dense. Species present included *M. exalbescens*, *Ranunculus circinatus*, *Ceratophyllum demersum* and *Potamogeton pectinatus*. Heavy cover of periphyton on most plants, none surfacing.

Site 2. Downstream side of control gate on north end of dam structure. Water visibility good, strong back current. *R. circinatus*, *P. pectinatus*, *P. richardsonii* and *M. exalbescens* were observed in back waters.

Site 3. North shore, east end, Alberta Transportation campsite and boat launch (cement). Sand-gravel substrate near boat launch, rocky further offshore. No aquatic plant growth was observed.

Site 4. West end, Little Bow Provincial Park boat launch and dock. Sparse growth of *P. richardsonii* and *R. circinatus* at boat launch. Dense but immature growth in area of docks. Most plants were about a metre tall growing in approximately 3-4 m of water. Rooted vegetation was not visible from the surface. Other species present included *C. demersum*, *P. zosteriformis*, *Elodea canadensis* and *M. exalbescens*.

35. KEHO RESERVOIR (Figure 38)

Date: June 22, 1983

Site 1. East end of lake, south of canal. Shore of large boulders. Many drifting fragments including *Potamogeton richardsonii* and *P. vaginatus*. No rooted growth was visible near shore. Large bed of *P. richardsonii* (not surfacing) approximately 50 m offshore.

Site 2. East end of lake, mouth of outlet canal. Very dense surfacing weed growth extending from edge of shore outwards about 6-8 m along both shores of canal. Only the central portion of the canal was free of surfacing plants. *P. richardsonii* was most abundant, small amounts of *Ranunculus* sp. and *M. exalbescens* (immature) were also present. Water level in canal appeared low.

Site 3. Short distance down canal, just above control structure. Aquatic plants extending down both sides of canal, centre of channel open. *P. richardsonii* was dominant, with *M. exalbescens*, *P. vaginatus*, *Alisma gramineum* and *Sagittaria* sp. also present.

* See Maps (Appendix 1) for site locations.

35. KEHO RESERVOIR (Figure 38) continued....

* Site 4. North-west corner of reservoir, inlet canal and adjacent wetland-mud flats area. Dense beds of P. richardsonii (approximately 2 m wide) extending along both shores of inflow channel. Very sparse aquatic plant growth in centre of channel. Sagittaria sp. and Juncus sp. also present.

Site 5. South-east shore at boat launch near Keho Park. Cement slab boat launch is in disrepair. Edge of shore is very rocky (have been brought in to stabilize shore area). Sand-mud substrate. No rooted aquatic plant growth was observed, fragments of P. richardsonii, P. vaginatus and M. exalbescens on shore.

36. PARK LAKE RESERVOIR (Figure 39)

Date: June 21, 1983

Site 1. North end of lake, Park Lake Provincial Park boat launch and dock. High species diversity at this site with Potamogeton richardsonii being the most abundant species. Boat launch ramp was free of weed growth, most plants were on north side of dock and further offshore of launch ramp. Other abundant species included P. zosteriformis, P. pectinatus, P. pusillus, M. exalbescens, Najas flexilis and Typha latifolia. None surfacing or flowering, heavy periphyton cover on most plants.

Site 2. North end of lake, bay and dike area west of provincial park boat launch (Site 1). Large bed of Potamogeton praelongus (surfacing) extending throughout most of bay. M. exalbescens, Ceratophyllum demersum and P. vaginatus also present. Water visibility poor. Aquatic plant growth in this area is a nuisance to boat navigation and swimming.

37. CHIN LAKES RESERVOIR (Figure 40)

Date: Site 1 - July 18, 1983
Site 2 - August 19, 1983
Site 3 - August 2, 1983

Site 1. North shore, west of bridge. Dense bed of Potamogeton richardsonii (healthy and many in flower) growing parallel to shoreline. Weed bed extends several hundred metres along shore both east and west of bridge. Other aquatic macrophyte species present included P. vaginatus, P. zosteriformis, P. pectinatus, Elodea canadensis, Alisma gramineum and Ranunculus circinatus. Substrate of sand and mud.

* See Maps (Appendix 1) for site locations.

37. CHIN LAKES RESERVOIR (Figure 40) continued....

* Site 2. South shore, west of bridge at Alberta Transportation operated campsite. Water shallow, sand-mud substrate. *P. richardsonii*, *Elodea canadensis* and *Ranunculus circinatus* abundant. Sparse growth of *Potamogeton zosteriformis* and *M. exalbescens* also present. *Chara* sp. abundant in deeper waters.

Site 3. South shore, east of bridge at boat launch. Boat ramp constructed of cement, adjacent shoreline consisted of very coarse gravel and rocks. Sand-gravel and rock substrate. Aquatic plant growth sparse in vicinity of boat launching area, was more dense between launch and bridge. *P. richardsonii* and *R. circinatus* were the most abundant species. Other species present included *Potamogeton friesii*, *P. zosteriformis* and *Elodea canadensis*.

38. ELKWATER LAKE (Figure 41)

Date: July 27, 1983

Site 1. East end of lake, water shallow, large beds of *Typha latifolia* and *Scirpus* sp. bordering shoreline of almost entire bay.

Site 2. South shore, provincial park boat launch and docks. Dock facilities large and well maintained. Aquatic plants at launch site limited to very sparse *Potamogeton richardsonii* growth. Considerable growth in dock area, but not as dense or mature as that noted in 1982. *P. richardsonii* was dominant, other species present included *Ceratophyllum demersum*, *M. exalbescens*, *P. pusillus* and *P. vaginatus*. Expansive bed of *T. latifolia* west of launch area. *Equisetum fluviatile* was also present here.

Site 3. South shore, canoe launch and day use area west of Site 2. Very sparse growth including *P. richardsonii*, *M. exalbescens* and *Sagittaria* sp.
Large beds of *Typha latifolia* and *P. richardsonii* were observed along shore between Sites 3 and 2. Other species present in this area included *Polygonum natans* and *Utricularia vulgaris*.

39. SPRUCE COULEE RESERVOIR (Figure 42)

Date: July 27, 1983

---

* See Maps (Appendix 1) for site locations.

39. SPRUCE COULEE RESERVOIR (Figure 42) continued....

* Site 1. North end and west shore of reservoir. No power boats allowed in reservoir but popular with canoeists. Abundant aquatic plant growth around most of lake shore, species diversity high. Ranunculus circinatus is most abundant species (many surfacing and in flower). Potamogeton richardsonii, M. exalbescens and Hippuris vulgaris also were abundant. Water visibility good; silt-mud substrate.

40. REESOR LAKE RESERVOIR (Figure 43)

Date: July 28, 1983

Site 1. North shore, day use and pier area. Dense aquatic plant growth throughout most of littoral area, some surfacing. Ranunculus circinatus dominant (some flowering). Other abundant species included Ceratophyllum demersum, Potamogeton richardsonii and Myriophyllum exalbescens. Aquatic macrophytes here are a nuisance to shore fishermen.

Site 2. South end of lake, boat launch and adjacent shoreline. Scattered growth at launch site, growth more dense north of launch and further offshore. Very few plants surfacing. R. circinatus was dominant, C. demersum also was abundant. High species diversity along west shore. Shore fisherman complained about the weed growth.

41. CROWSNEST LAKE (Figure 44)

Date: July 12, 1983

This was a visual survey. No boat launching facilities were observed. Water very clear, depth drops off quickly, stone-rock substrate. No aquatic macrophytes were observed. This lake does not warrant surveys.

42. ISLAND LAKE (Figure 45)

Date: July 12, 1983

Site 1. North shore, Alberta Transportation operated campground and boat launches. Two boat launches (gravel) appear to be used only occasionally. No aquatic plant growth at launch sites. Gravel-stone substrate, rapid drop off. Equisetum palustre and Juncus sp. observed at east end near outflow.

- Due to location along major east-west highway route and proximity to B.C., this lake is a likely site for introduction of Eurasian water milfoil.

* See Maps (Appendix 1) for site locations.

43. BEAUVAIS LAKE (Figure 46)

Date: July 13, 1983

Site 1. North-west end of lake, provincial park boat launch and dock area. Dense aquatic weed growth throughout area (some surfacing), dominated by *Potamogeton pusillus*, *P. zosteriformis* and *Ceratophyllum demersum*. *P. richardsonii*, *P. pectinatus* (sparse), *Myriophyllum exalbescens*, *Ranunculus circinatus* and *Elodea canadensis* also present. Moderate periphyton cover on lower portions of plants.

Site 2. North shore, cottage and beach area. Abundant weed growth throughout most of littoral zone. *R. circinatus* (many surfacing and in flower) abundant close to shore. Dense but narrow beds of *M. exalbescens* (some surfacing) growing along shore at an average distance of 2.5 m from shore. *C. demersum*, *E. canadensis* and *P. richardsonii* abundant in deeper waters.
Aquatic weed growth in beach area is at nuisance levels; interferes with swimming and shore fishing.

Site 3. East end of lake, bay east of beach and narrow outflow arm. Very dense aquatic plant growth, *M. exalbescens* dominant. *Polygonum* natans abundant in patches. *Potamogeton pusillus*, *P. natans*, *P. zosteriformis* and *Nuphar variegatum* also present. Water is shallow, silt-organic mud substrate.
Aquatic plant growth in this area seriously hinders boat navigation.
Only sparse weed growth was observed along south shore, water depth drops off more quickly than on north shore. No cottages are present on south shore.

44. BEAVER MINES LAKE (Figure 47)

Date: July 12, 1983

Site 1. South-east shore, Forestry Service maintained campground and gravel boat launch. *Myriophyllum exalbescens* (dominant), *Potamogeton richardsonii* and *P. zosteriformis* very abundant on north side of boat launch. *Polygonum natans*, *Typha latifolia* and *Juncus* sp. were also present. Water visibility was approximately 3 m, silt-organic mud substrate.
Very strong winds prevented use of boat for survey.
This lake is a likely site for introduction of Eurasian water milfoil.

45. WATERTON RESERVOIR (Figure 48)

Date: July 13, 1983

Site 1. North-west tip of reservoir, gravel-mud boat launch area. No dock or mooring facilities present. No aquatic vegetation was observed, probably due to considerable seasonal fluctuations in reservoir water levels. Strong winds and wave action common here.
The development of a serious aquatic weed infestation in this reservoir is unlikely.

46. ST. MARY RESERVOIR (Figure 49)

Date: July 14, 1983

Site 1. North-east end of reservoir, Cardston Boat Club launch and dock facilities (private). This is the main recreational area on the reservoir. A small but dense bed of *Potamogeton richardsonii* was observed offshore of docks. Plants were about 2 m tall (not surfacing). Sparse growth of *Potamogeton pusillus* was also present.

Site 2. North-east corner of reservoir, public use boat launch and pier. Very sparse aquatic plant growth. Species present were *P. pusillus*, *Equisetum fluviatile* and *Chara* sp.

Site 3. North-east end of reservoir, public boat launch on north shore. No dock or mooring facilities. No aquatic plant growth observed. Gravel-stone substrate.

Site 4. Pond and channel draining into St. Mary River at bottom of spillway. Popular fishing spot. A few very small *Myriophyllum exalbescens* plants growing among rocks and boulders where channel enters St. Mary River. Other species present included *Potamogeton pectinatus*, *P. pusillus* and *P. richardsonii*.

- *Potamogeton richardsonii* was the most abundant species within the reservoir.

47. POLICE (OUTPOST) LAKE (Figure 50)

Date: July 14, 1983

Site 1. South end, provincial park boat launch and dock. Moderate to dense weed growth in all littoral regions, *Myriophyllum exalbescens* was most abundant. Other species present included *Polygonum natans*, *Potamogeton vaginatus*, *P. pusillus*, *P. richardsonii* (sparse), and *P. pectinatus*. Heavy cover of periphyton on lower portions of most plants. Some plants in shallow areas were surfacing.

47. POLICE (OUTPOST) LAKE (Figure 50) continued....

Site 2. South-east end of island, popular fishing area. Moderate to dense weed growth, high species diversity. Species present included *Potamogeton zosteriformis* and all species noted at Site 1. *Potamogeton vaginatus* was most abundant.

Site 3. North side of island. Dense submergent growth throughout littoral areas. Species present included *P. vaginatus* (dominant), *P. richardsonii*, *P. pusillus*, *P. zosteriformis*, *M. exalbescens* and *Polygonum natans*. *Scirpus* sp. was also abundant. Most submergent species were in immature growth stages, none were surfacing or flowering.

Site 4. Sheltered bay on north shore, cattle grazing to waters edge. Sparse to moderate aquatic plant growth including *M. exalbescens*, *P. vaginatus* (most abundant), *P. richardsonii* and *Scirpus* sp. *P. richardsonii* plants were most common in shallow water, plants very small. *M. exalbescens* plants also were very small. No surfacing growth was observed. Many large stones along shore extending to a water depth of approximately one m, silt-mud substrate further offshore.

- Aquatic macrophyte growth and distribution at all sites was very similar to that observed during the 1982 survey (Stockerl, *et al*., 1983).
- *P. vaginatus* was dominant at most sites.
- *M. exalbescens* was abundant at all sites but plants were generally short, occupying the area beneath the canopy of taller plants such as *P. vaginatus*.
- Heavy cover of periphyton on lower portions of plants was common at all sites.

REFERENCES

1) Anon. 1981. Information Bulletin. Aquatic Plant Management Program; Vol. XI: A Summary of Biological Research on Eurasian Water Milfoil in British Columbia. Dec. 1981. British Columbia Min. of Envir. Aquatic Studies Br. 18 pp.

2) Bayley, S., H. Rabin and C. H. Southwick. 1968. Recent decline in the distribution and abundance of Eurasian milfoil in Chesapeake Bay. Chesapeake Sci. 9(3): 173-181.

3) Buchanan, R. J. 1976. Briefing paper on Eurasian water milfoil (*Myriophyllum spicatum* L.). Water Investigations Branch Report No. 2463, British Columbia Min. of Envir. 16 pp.

4) Dove, R. F. and D. R. B. Malcolm. 1980. Studies on Aquatic Macrophytes Part XXXII. The 1979 aquatic plant quarantine project. Inventory and Engineering Branch Report No. 2905, British Columbia Min. of Envir. 48 pp.

5) Scales, P. and A. Bryan. 1979. Studies on Aquatic Macrophytes. Part XXVII. Transport of *Myriophyllum spicatum* fragments by boaters and assessment of the 1978 Boat Quarantine Program. W.I.B. Report No. 2761, British Columbia Ministry of Environment. 55 pp.

6) Shea, D. and M. D. O'Shea. 1981. Eurasian Water Milfoil Alberta Lake Survey 1981. Alberta Environment, Pollution Control Division, Pesticide Chemicals Br. (Unpublished). 35 pp.

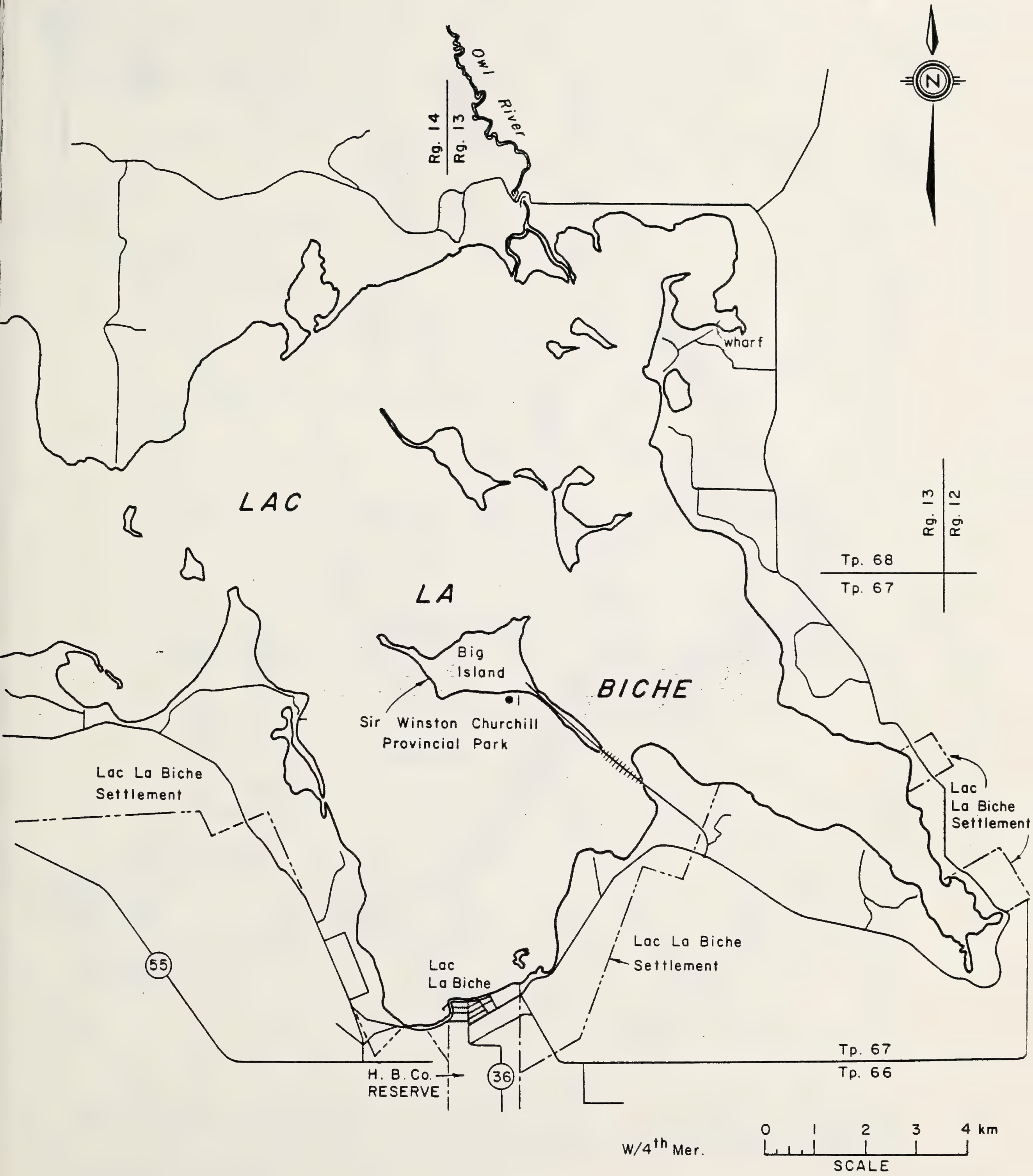
7) Stockerl, E. C. and contributors. 1984. Eurasian Water Milfoil, Alberta Lake Survey 1982. Alberta Environment, Pollution Control Division, Pesticide Chemicals Br. (in preparation). 65 pp.

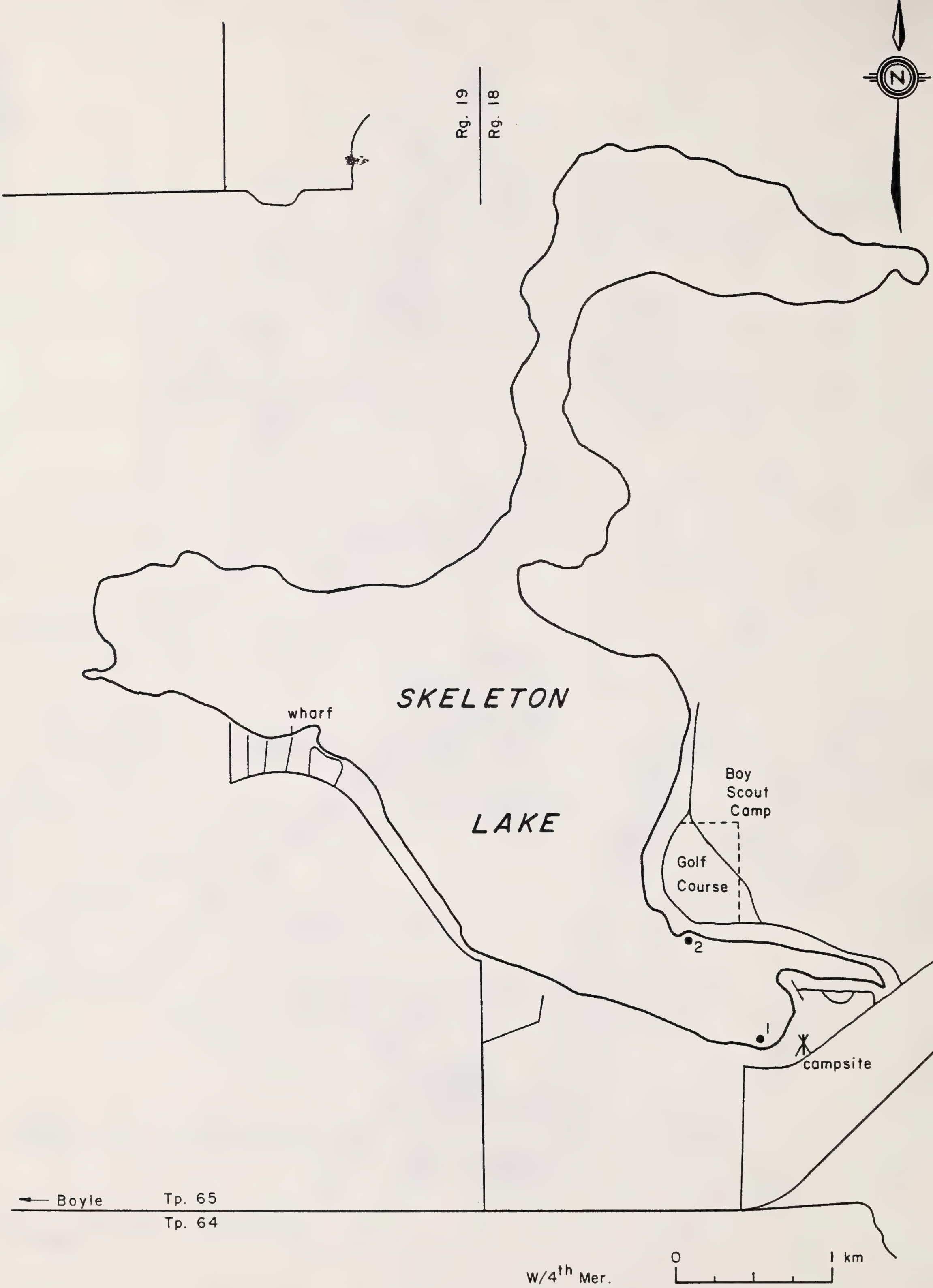
8) Stockerl, E. C. and R. L. Kent. 1984. The Distribution, Identification, Biology and Management of Eurasian Water Milfoil: An Alberta Perspective. Alberta Environment, Pollution Control Division, Pesticide Chemicals Br. (in preparation). 90 pp.

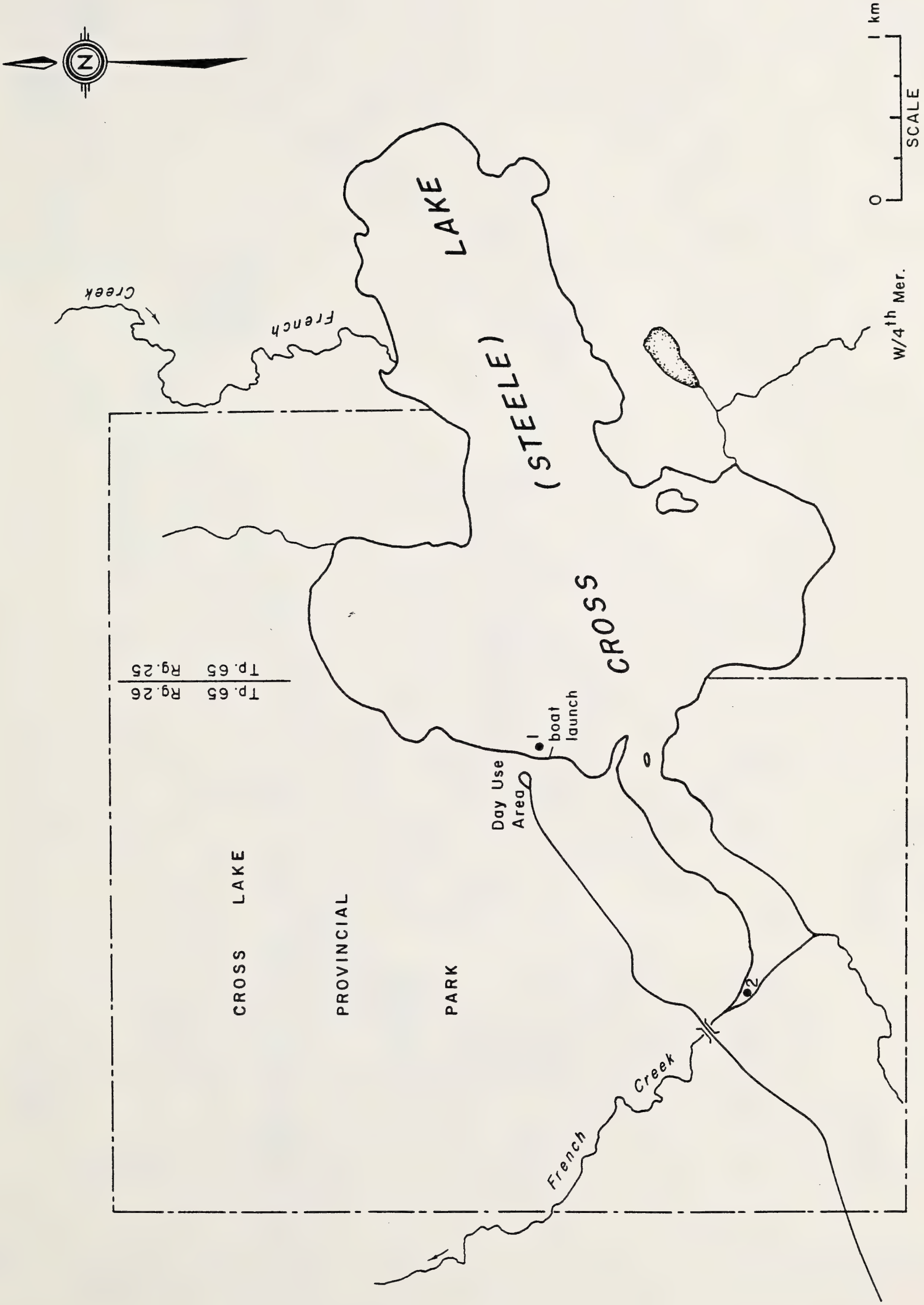
9) Wile, I. 1978. Environmental effects of mechanical harvesting. Journal of Aquatic Plant Management 16: 14-20.

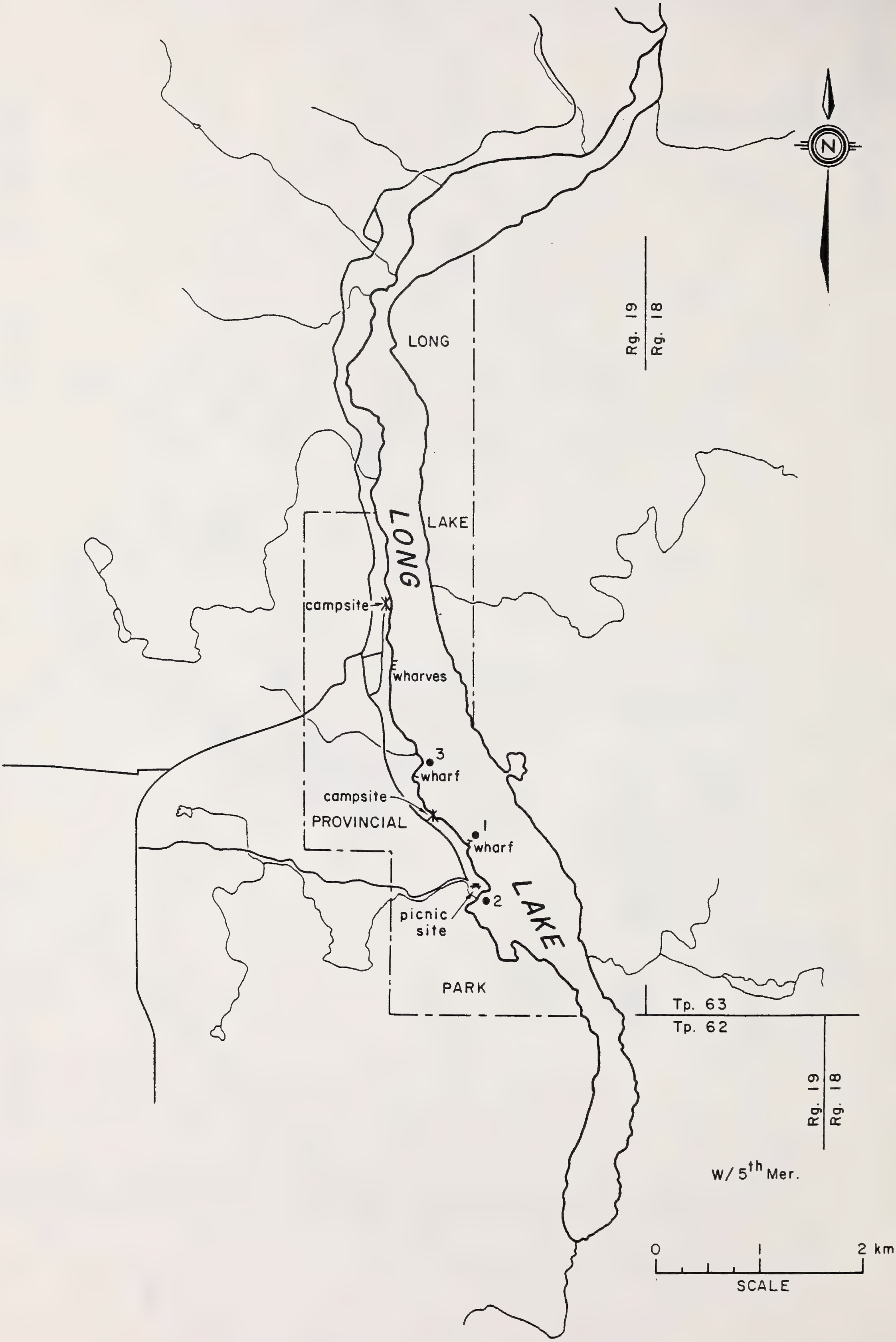
APPENDIX I

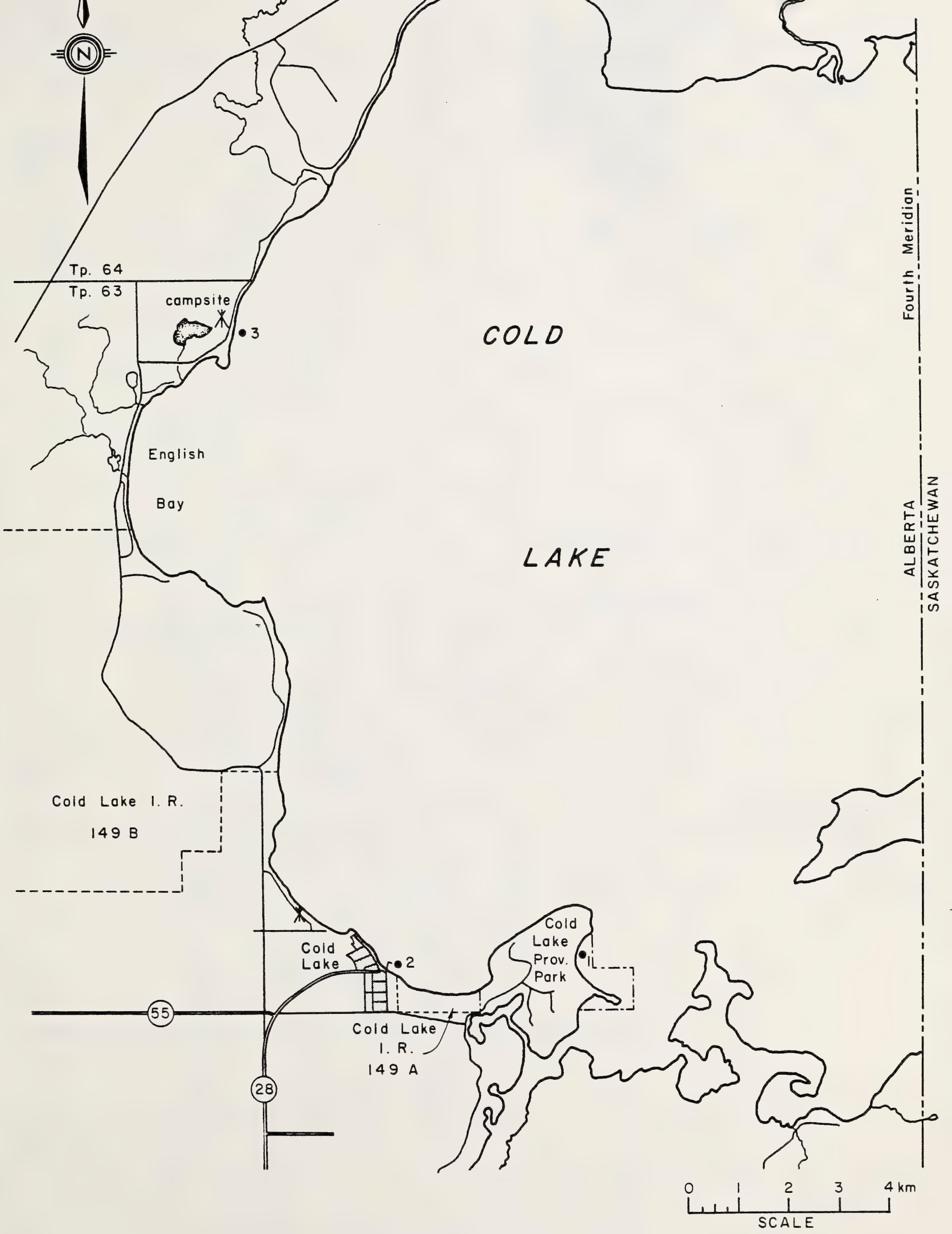
Maps of Lakes and Reservoirs Surveyed for
Eurasian Water Milfoil During 1983.

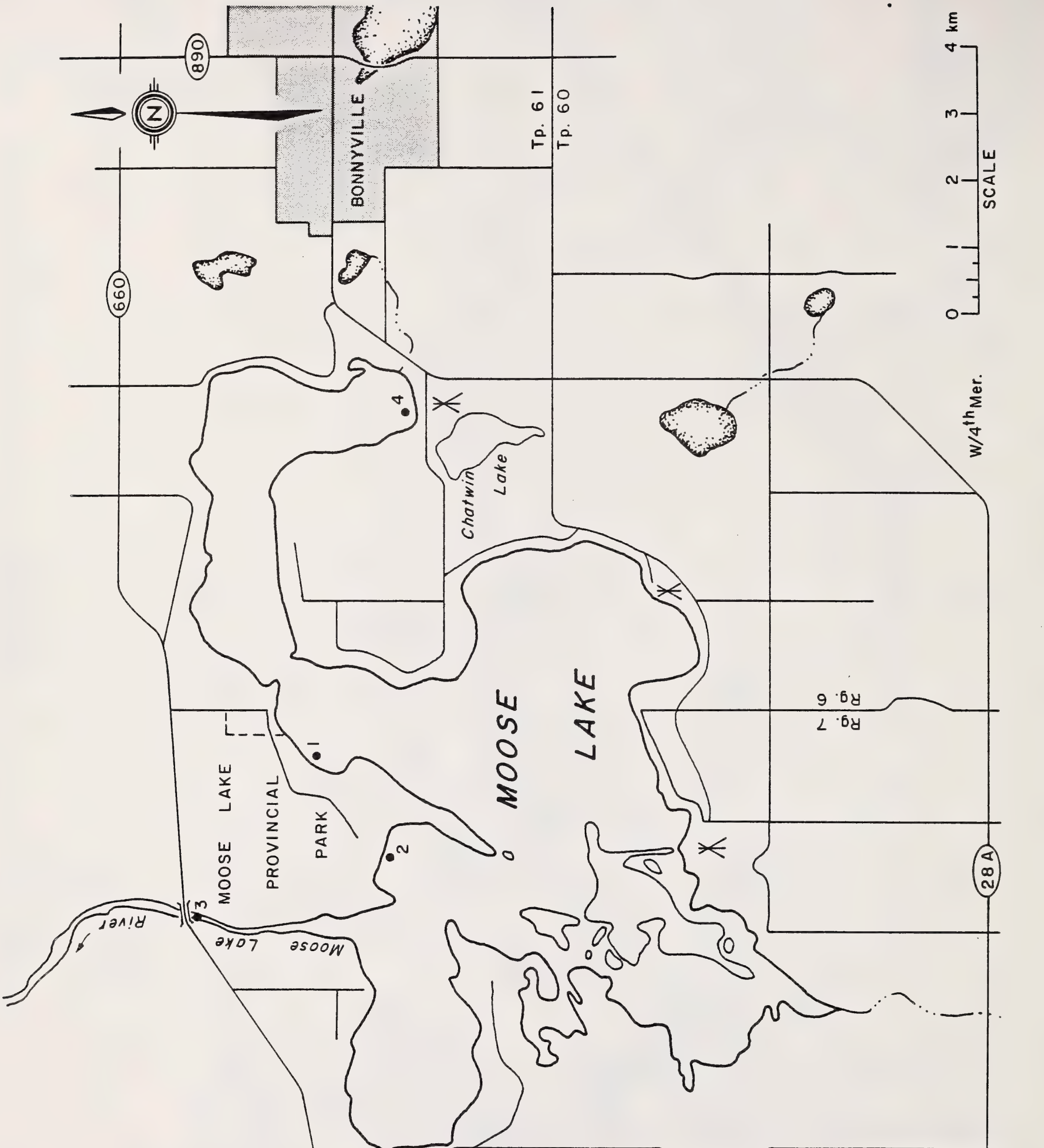

Owl River
Rg. 14
Rg. 13
N
wharf
LAC
LA
BICHE
Rg. 13
Rg. 12
Tp. 68
Tp. 67
Big Island
1
Sir Winston Churchill Provincial Park
Lac La Biche Settlement
Lac La Biche Settlement
Lac La Biche Settlement
Lac La Biche
55
36
H. B. Co. RESERVE
Tp. 67
Tp. 66
W/4th Mer.
0 1 2 3 4 km
SCALE


Rg. 19
Rg. 18
N
SKELETON
LAKE
wharf
Boy
Scout
Camp
Golf
Course
2
1
campsite
← Boyle
Tp. 65
Tp. 64
W/4th Mer.
0
1 km

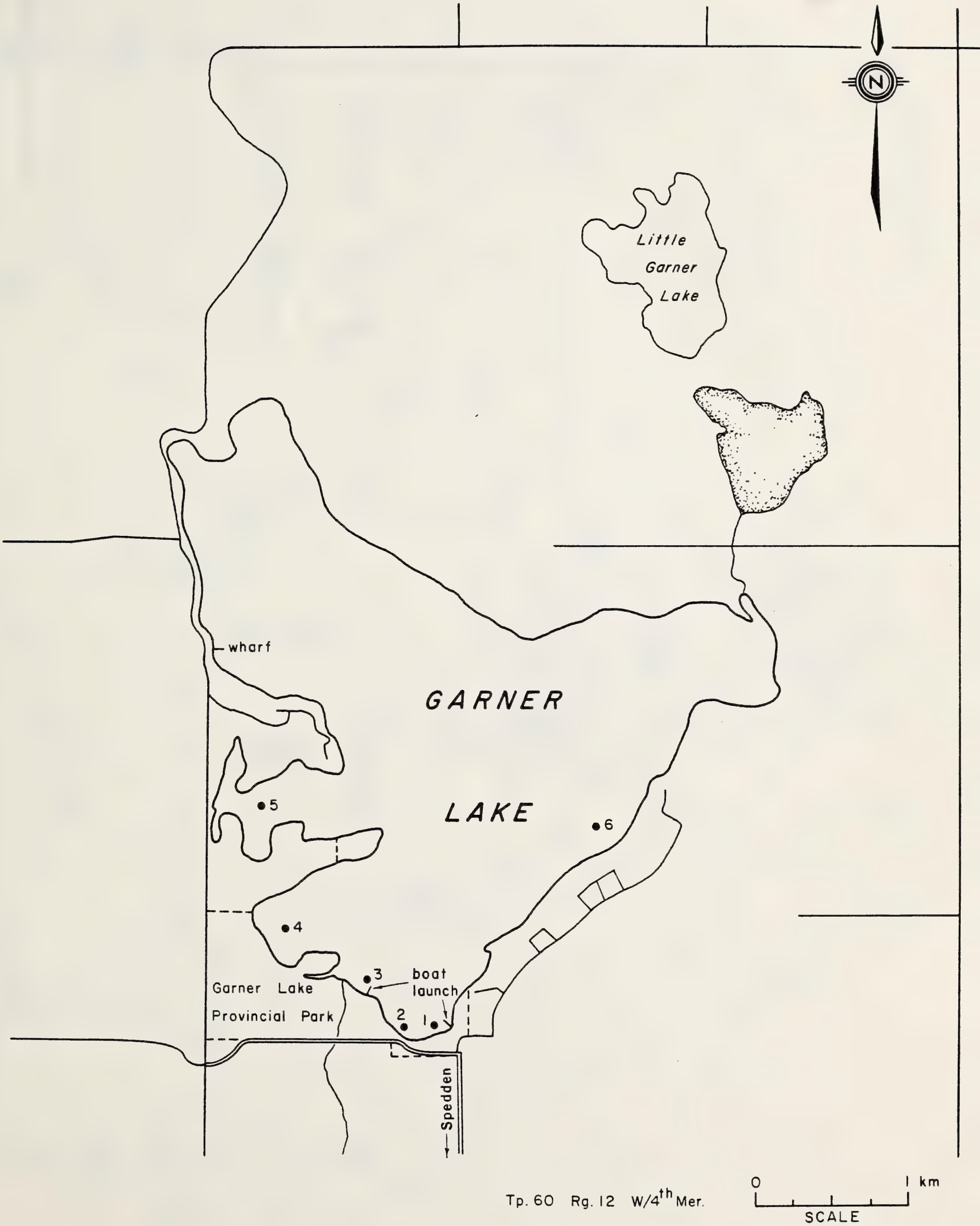

N
CROSS LAKE (STEELE) LAKE
French Creek
French Creek
Tp.65 Rg.26
Tp.65 Rg.25
1 boat launch
Day Use Area
2
CROSS LAKE PROVINCIAL PARK
W/4th Mer.
SCALE
0
1 km

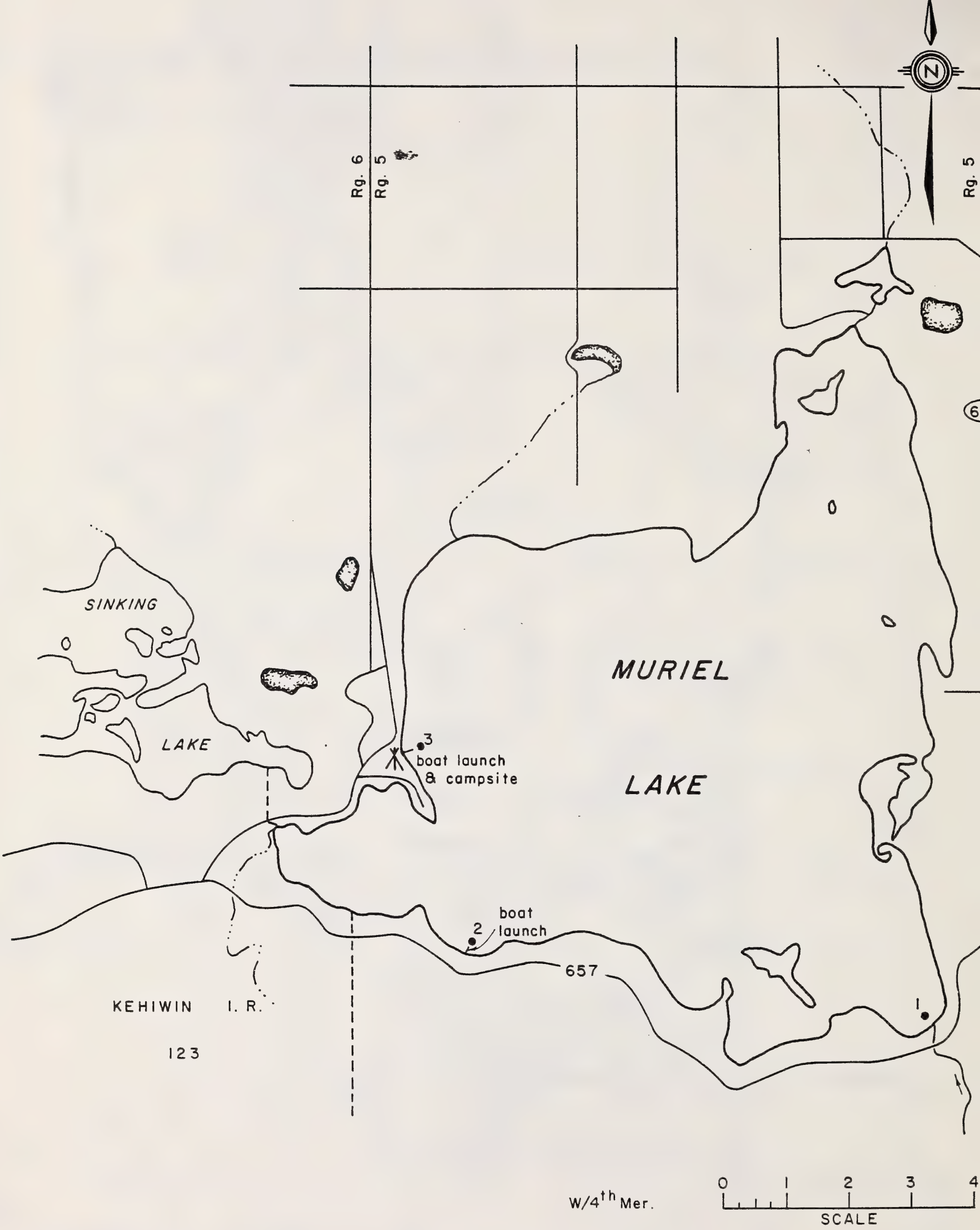

N
LONG
Rg. 19
Rg. 18
LONG
LAKE
campsite
wharves
3
wharf
campsite
PROVINCIAL
1
wharf
LAKE
picnic site
2
PARK
Tp. 63
Tp. 62
Rg. 19
Rg. 18
W/5th Mer.
0
2 km
SCALE

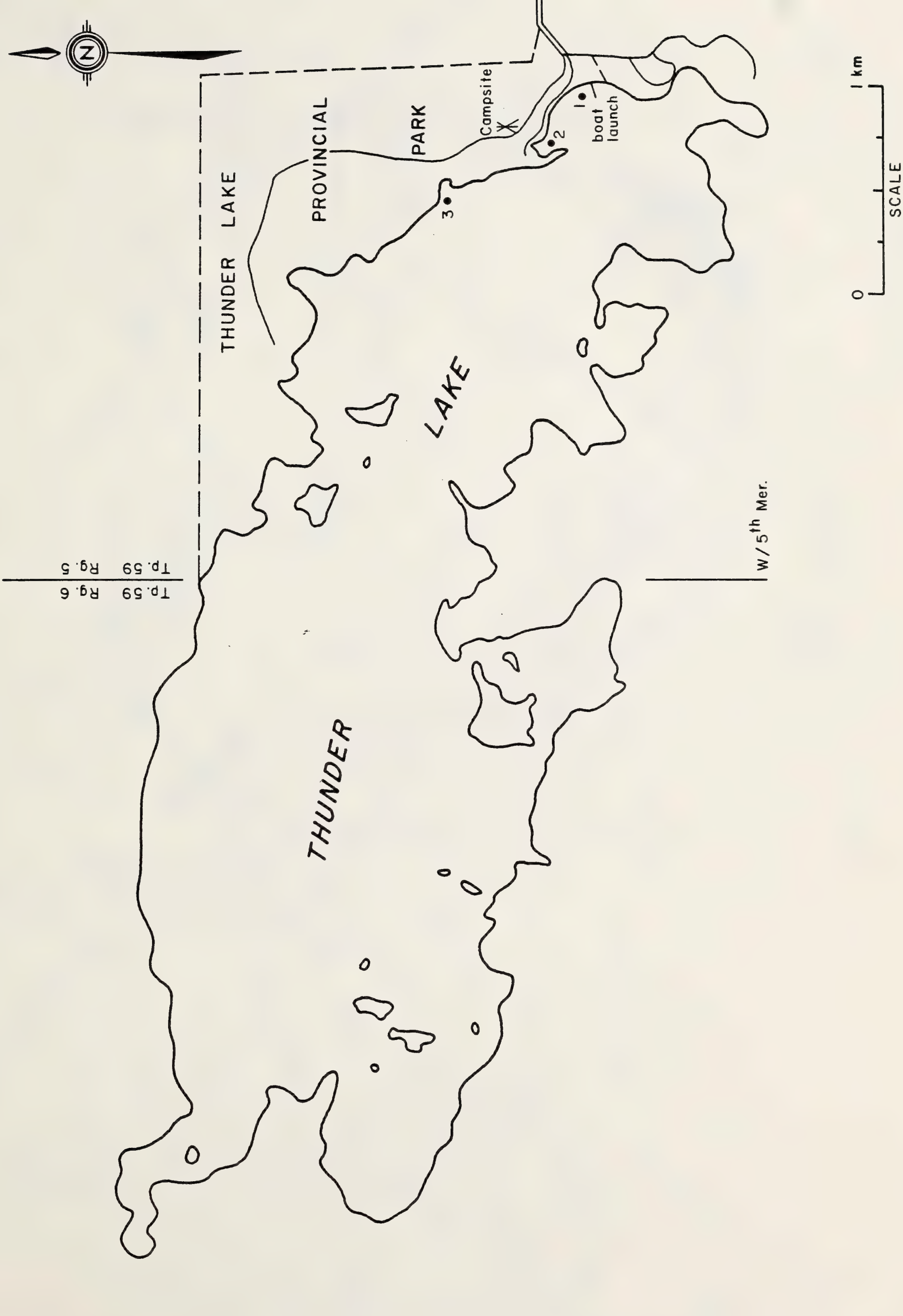

N
Tp. 64
Tp. 63
campsite
3
COLD
LAKE
English
Bay
Fourth Meridian
ALBERTA
SASKATCHEWAN
Cold Lake I. R.
149 B
Cold
Lake
2
Cold
Lake
Prov.
Park
1
55
Cold Lake
I. R.
149 A
28
0
1
2
3
4 km
SCALE

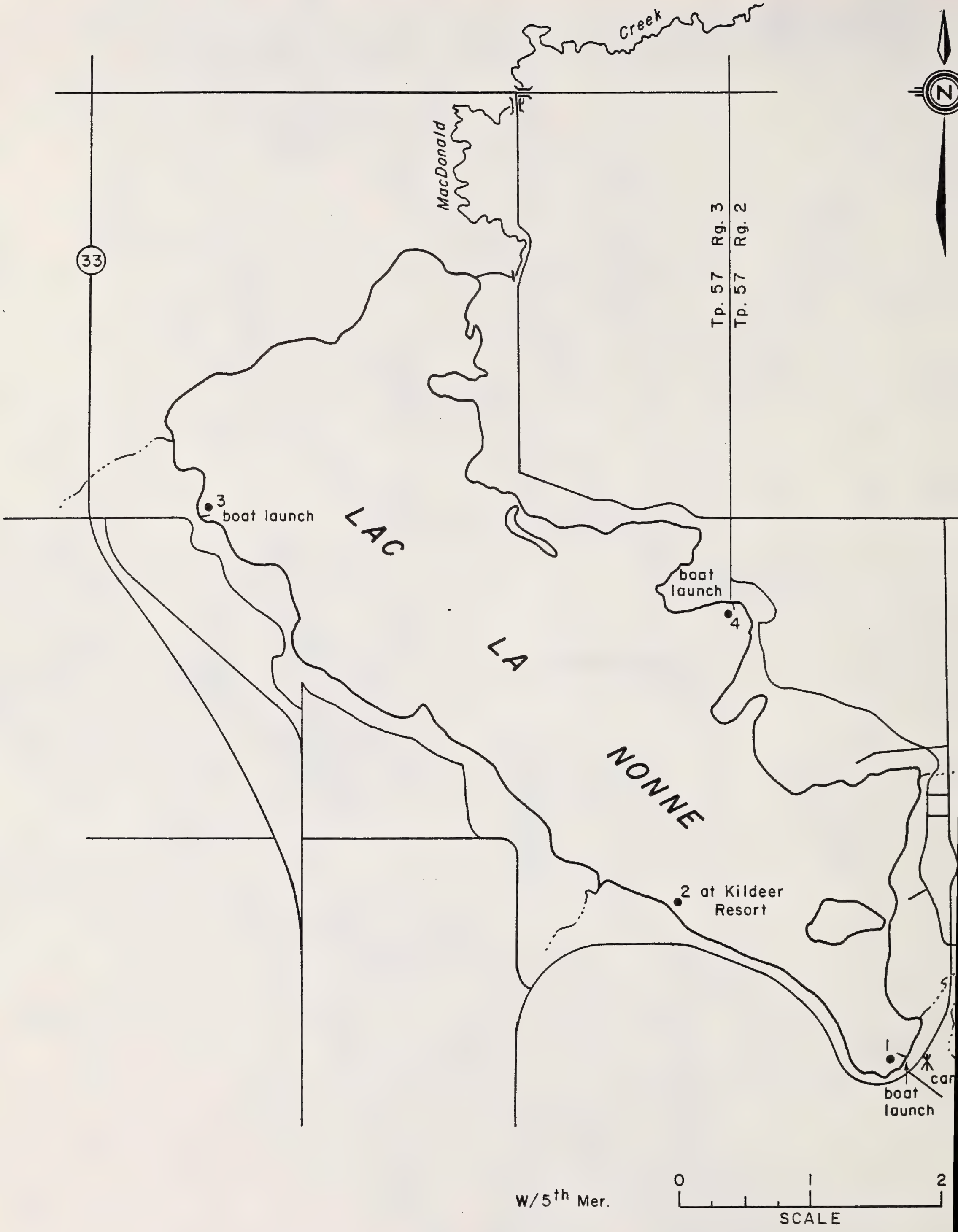


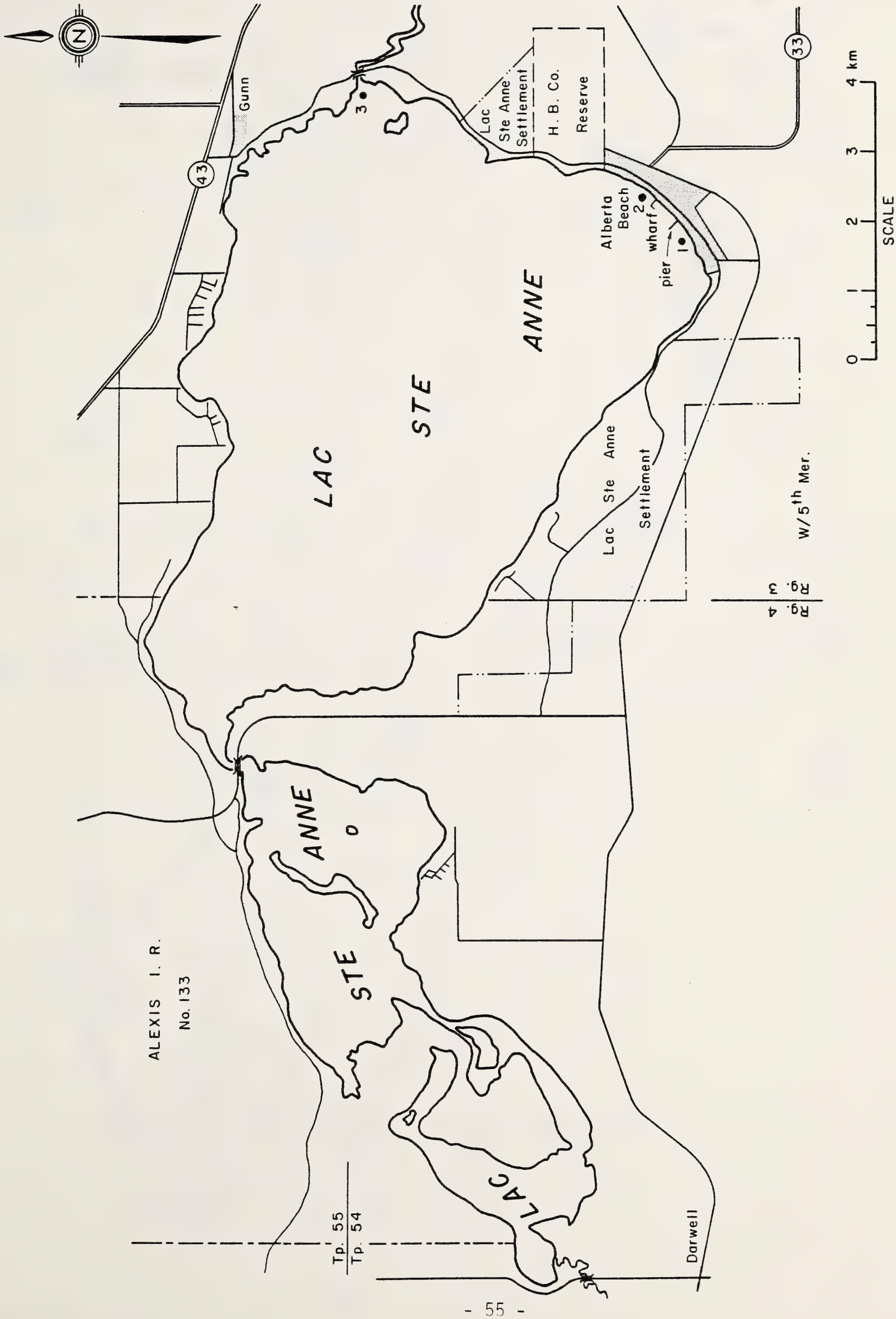
890
660
N
BONNYVILLE
Tp. 61
Tp. 60
SCALE
0
1
2
3
4 km
W/4th Mer.
Rg. 6
Rg. 7
28A
MOOSE LAKE
Chatwin Lake
MOOSE LAKE PROVINCIAL PARK
Moose Lake River
Thinlake River
Thin Lake
1
2
3
4

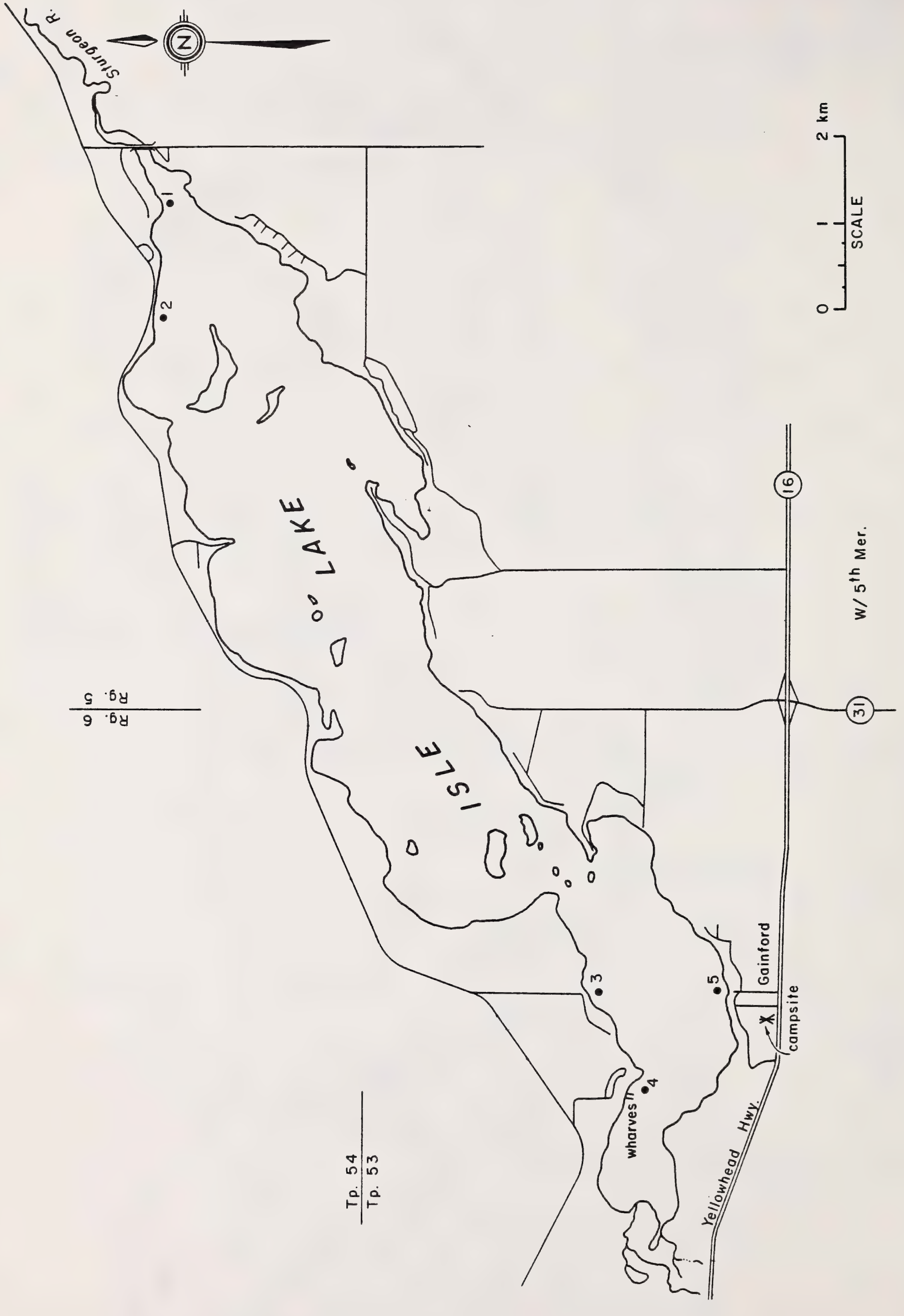

N
Little Garner Lake
wharf
GARNER LAKE
5
6
4
3
boat launch
2
1
Garner Lake Provincial Park
Spedden
Tp. 60 Rg. 12 W/4th Mer.
0
1 km
SCALE

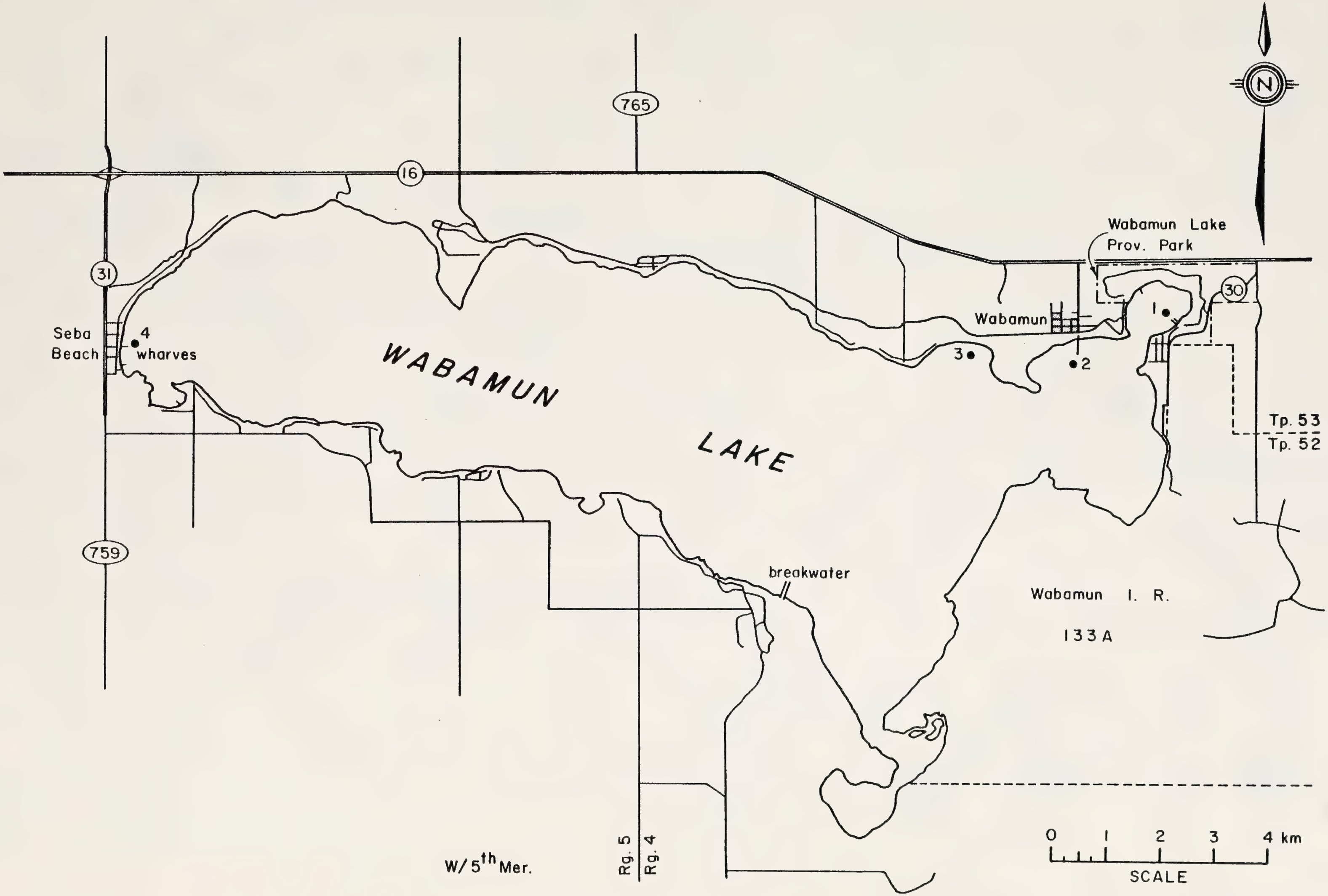

N
Rg. 6
Rg. 5
Rg. 5
SINKING
LAKE
MURIEL
LAKE
3
boat launch
& campsite
2
boat
launch
657
1
KEHIWIN I. R.
123
W/4th Mer.
0 1 2 3 4
SCALE

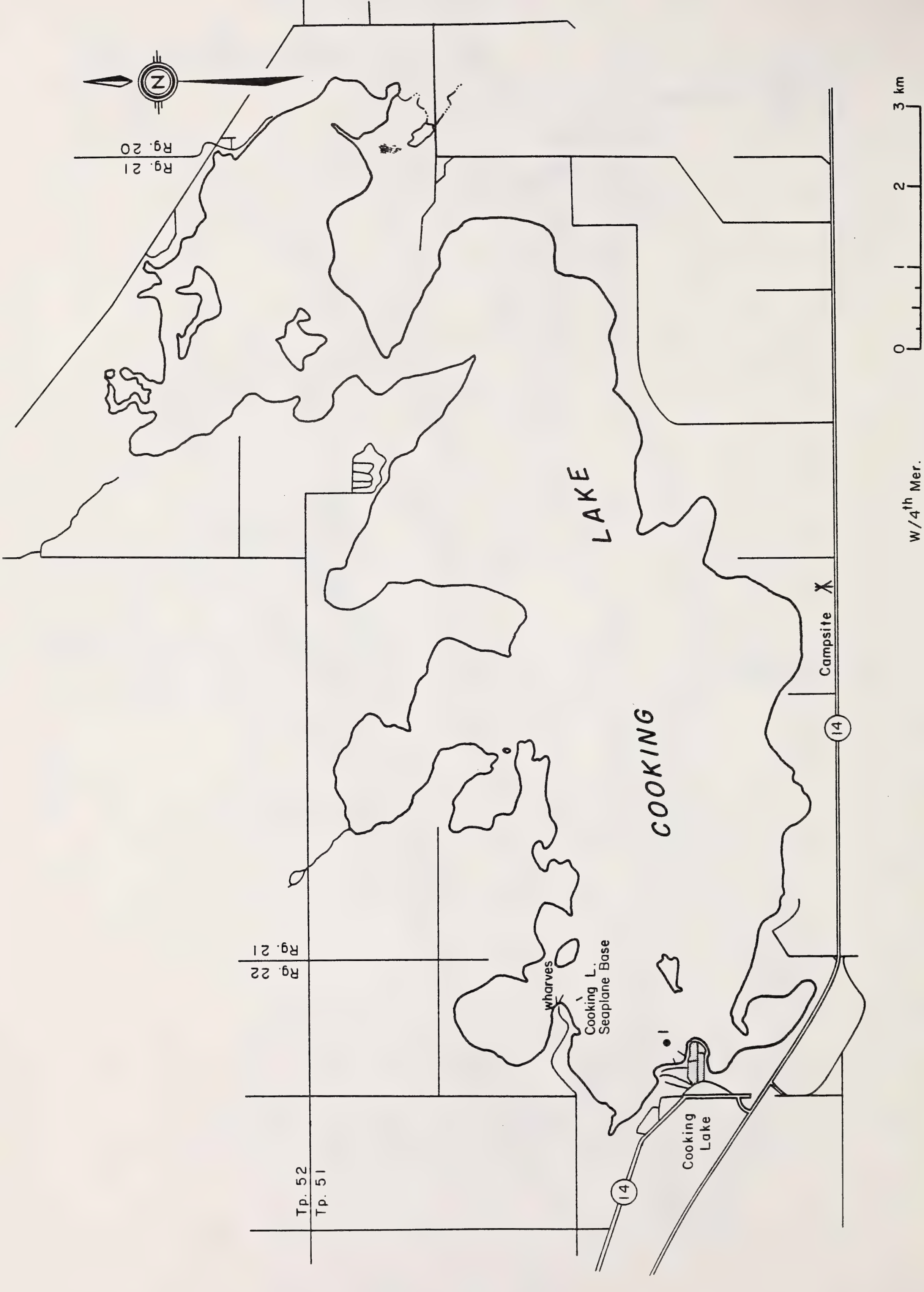

N
THUNDER LAKE PROVINCIAL PARK
Campsite
boat launch
1
2
3
THUNDER LAKE
Tp.59 Rg.5
Tp.59 Rg.6
W/5th Mer.
SCALE
0
1 km

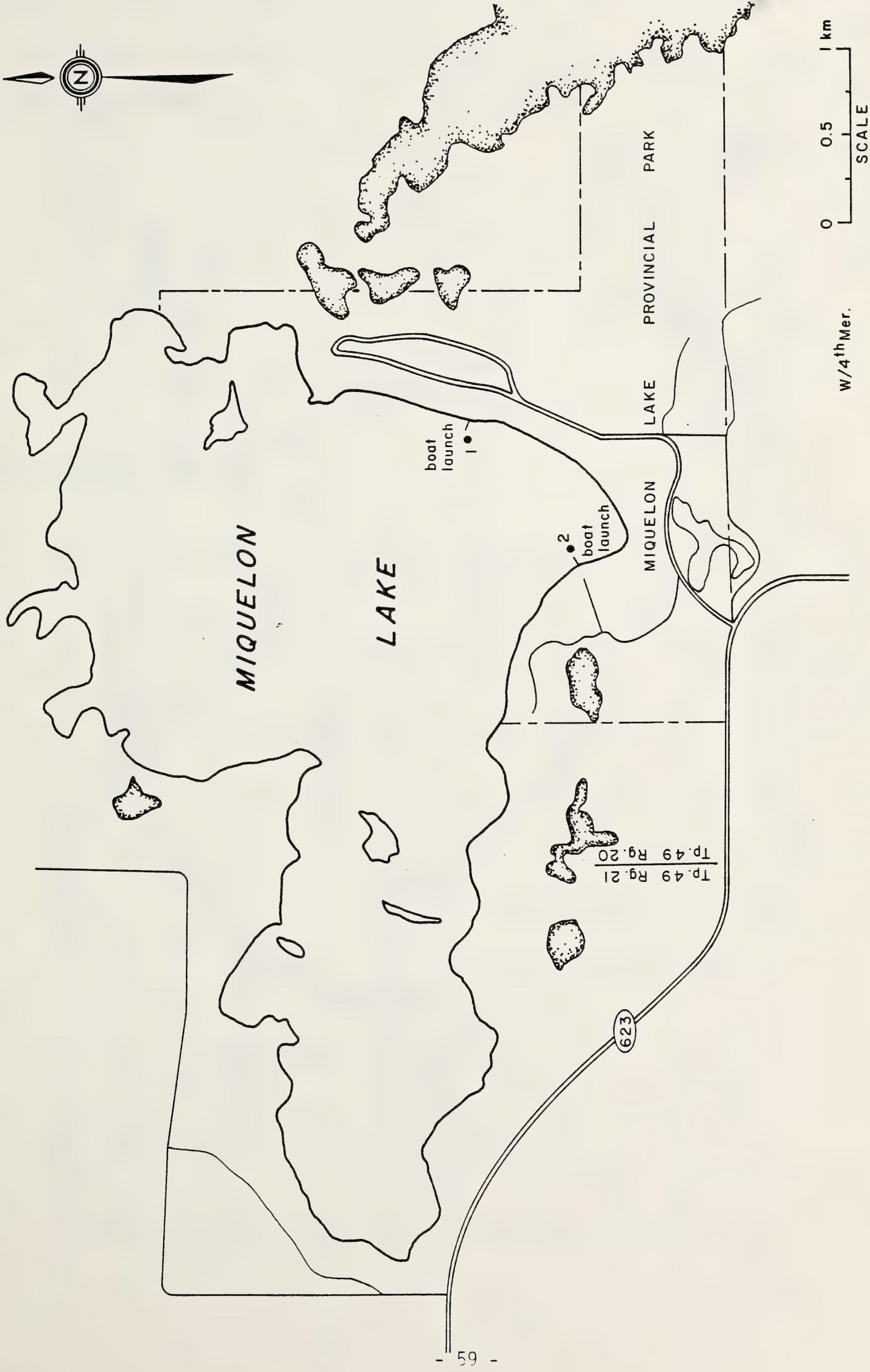

Creek
MacDonald
N
Tp. 57 Rg. 3
Tp. 57 Rg. 2
33
3 boat launch
LAC LA NONNE
boat launch
4
2 at Kildeer Resort
1
boat launch
ca
W/5th Mer.
0
1
2
SCALE

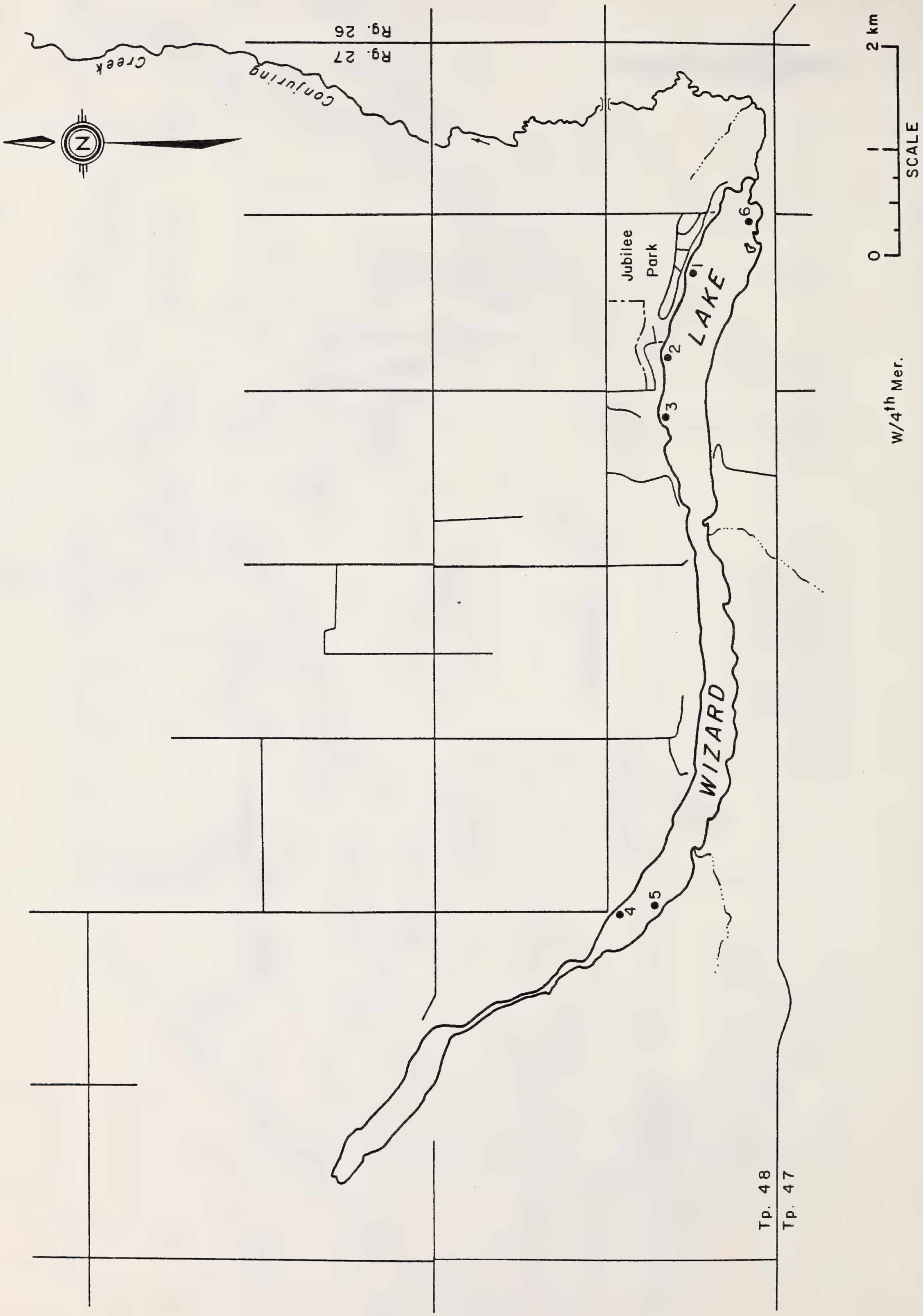

N
LAC STE ANNE
LAC STE ANNE
ALEXIS I. R.
No. 133
Tp. 55
Tp. 54
Darwell
Gunn
43
33
Lac Ste Anne Settlement
H. B. Co. Reserve
Alberta Beach
1
2
3
wharf
pier
Lac Ste Anne Settlement
W/5th Mer.
Rg. 4
Rg. 3
0
1
2
3
4 km
SCALE

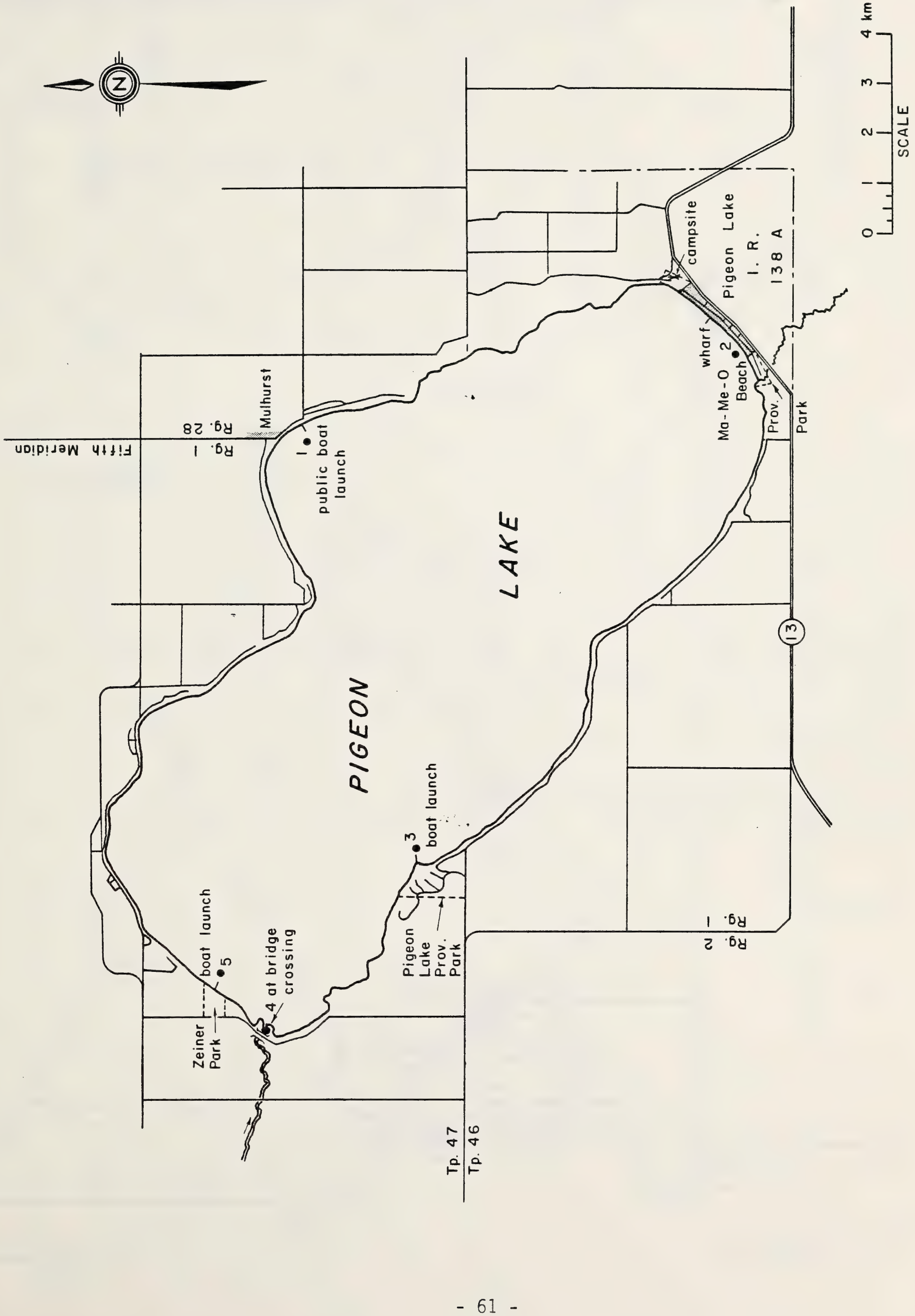

Sturgeon R.
N
ISLE
LAKE
1
2
3
4
5
wharves
Gainford
campsite
Yellowhead Hwy.
16
31
W/5th Mer.
Rg. 6
Rg. 5
Tp. 54
Tp. 53
0
1
2 km
SCALE

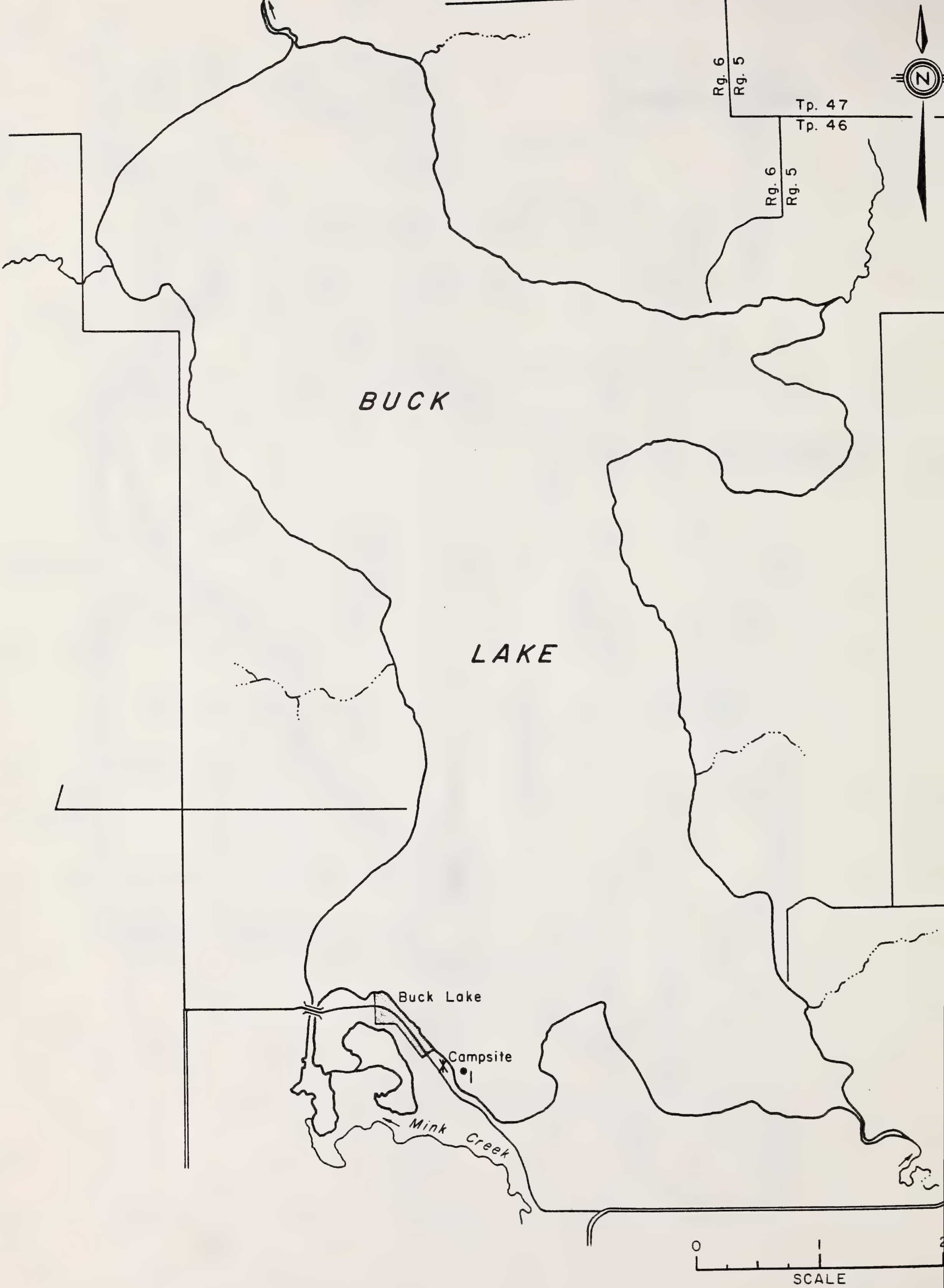

765
16
31
Seba
Beach
4
wharves
759
WABAMUN
LAKE
Wabamun Lake
Prov. Park
30
1
Wabamun
2
3
Tp. 53
Tp. 52
breakwater
Wabamun I. R.
133 A
W/5th Mer.
Rg. 5
Rg. 4
0
1
2
3
4 km
SCALE
N

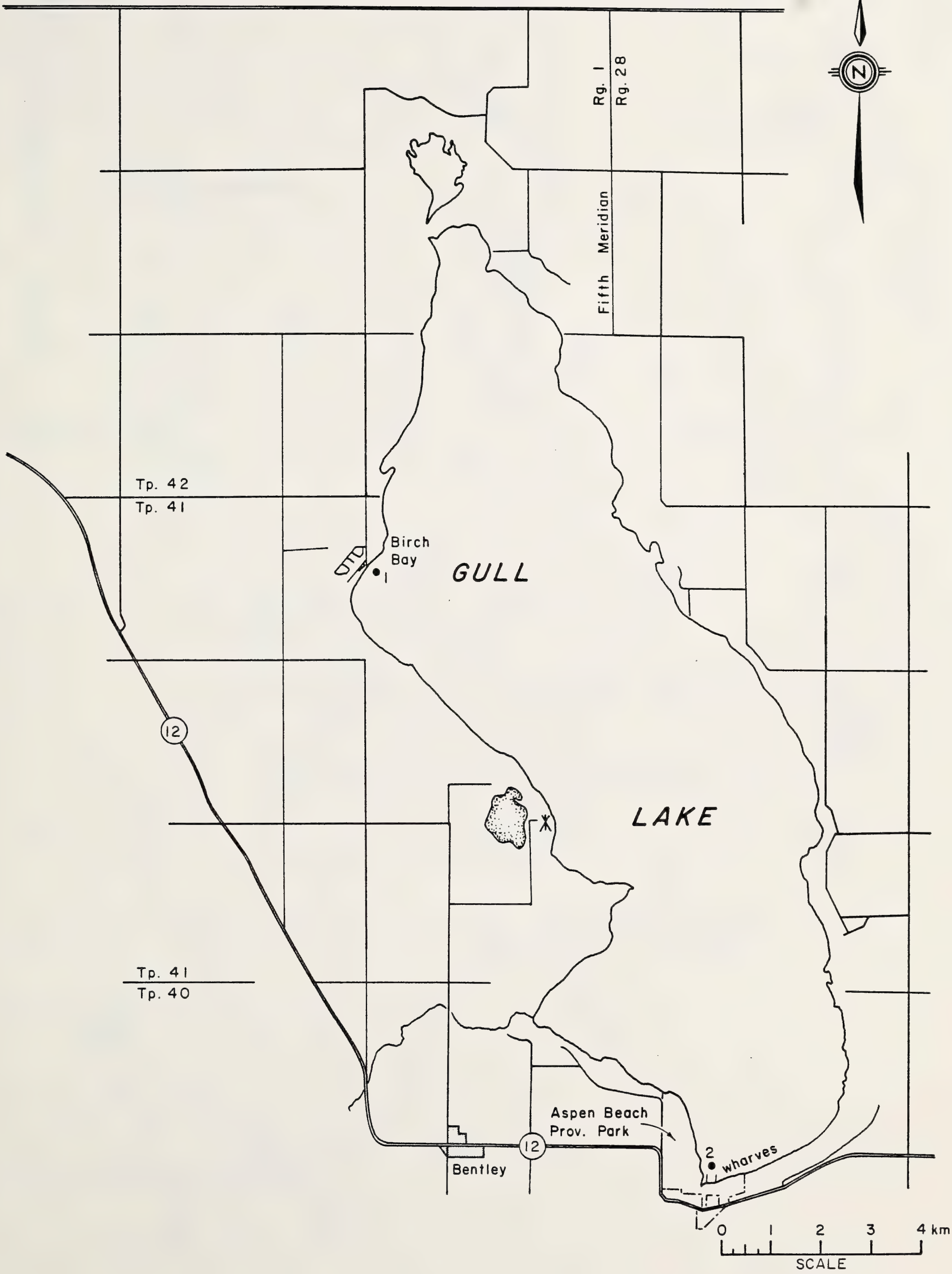

N
Rg. 20
Rg. 21
COOKING
LAKE
Campsite
14
Rg. 21
Rg. 22
wharves
Cooking L.
Seaplane Base
Cooking
Lake
14
Tp. 52
Tp. 51
W/4th Mer.
0
1
2
3 km

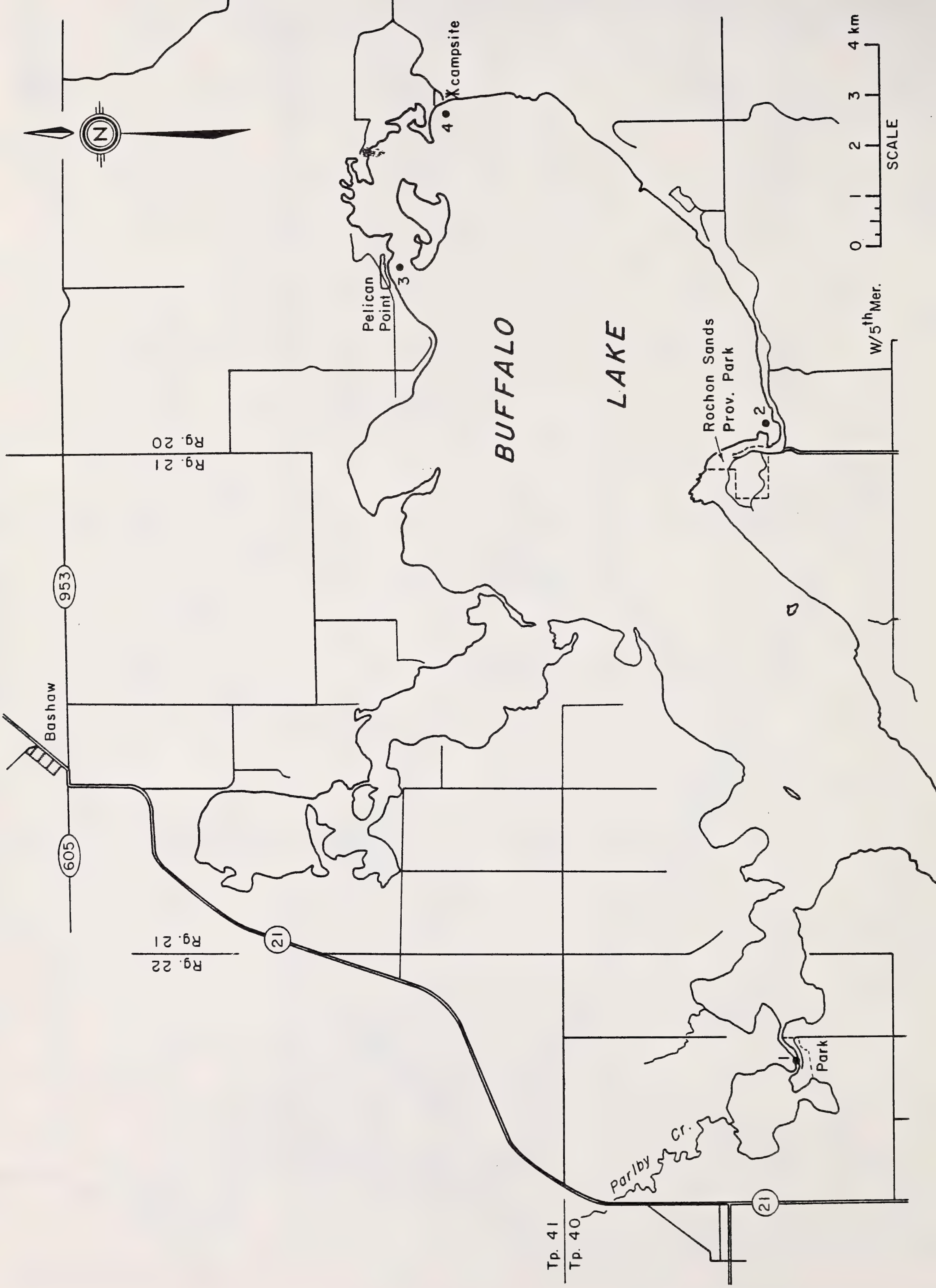

N
MIQUELON LAKE
boat launch 1
boat launch 2
MIQUELON LAKE PROVINCIAL PARK
Tp.49 Rg.21
Tp.49 Rg.20
623
W/4th Mer.
0
0.5
1 km
SCALE

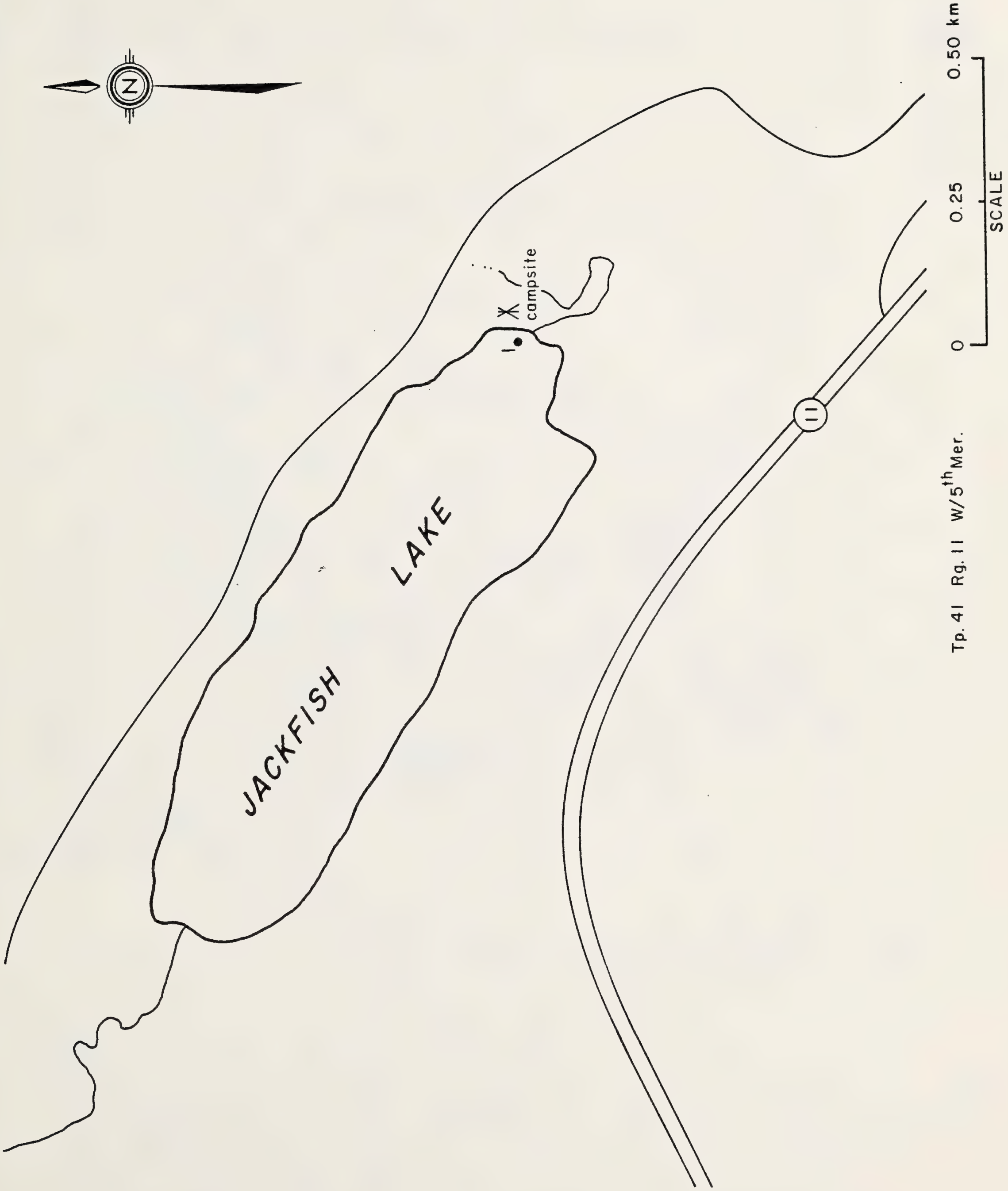

Conjuring Creek
Rg. 26
Rg. 27
Jubilee Park
WIZARD
LAKE
1
2
3
4
5
6
Tp. 48
Tp. 47
W/4th Mer.
0
2 km
SCALE

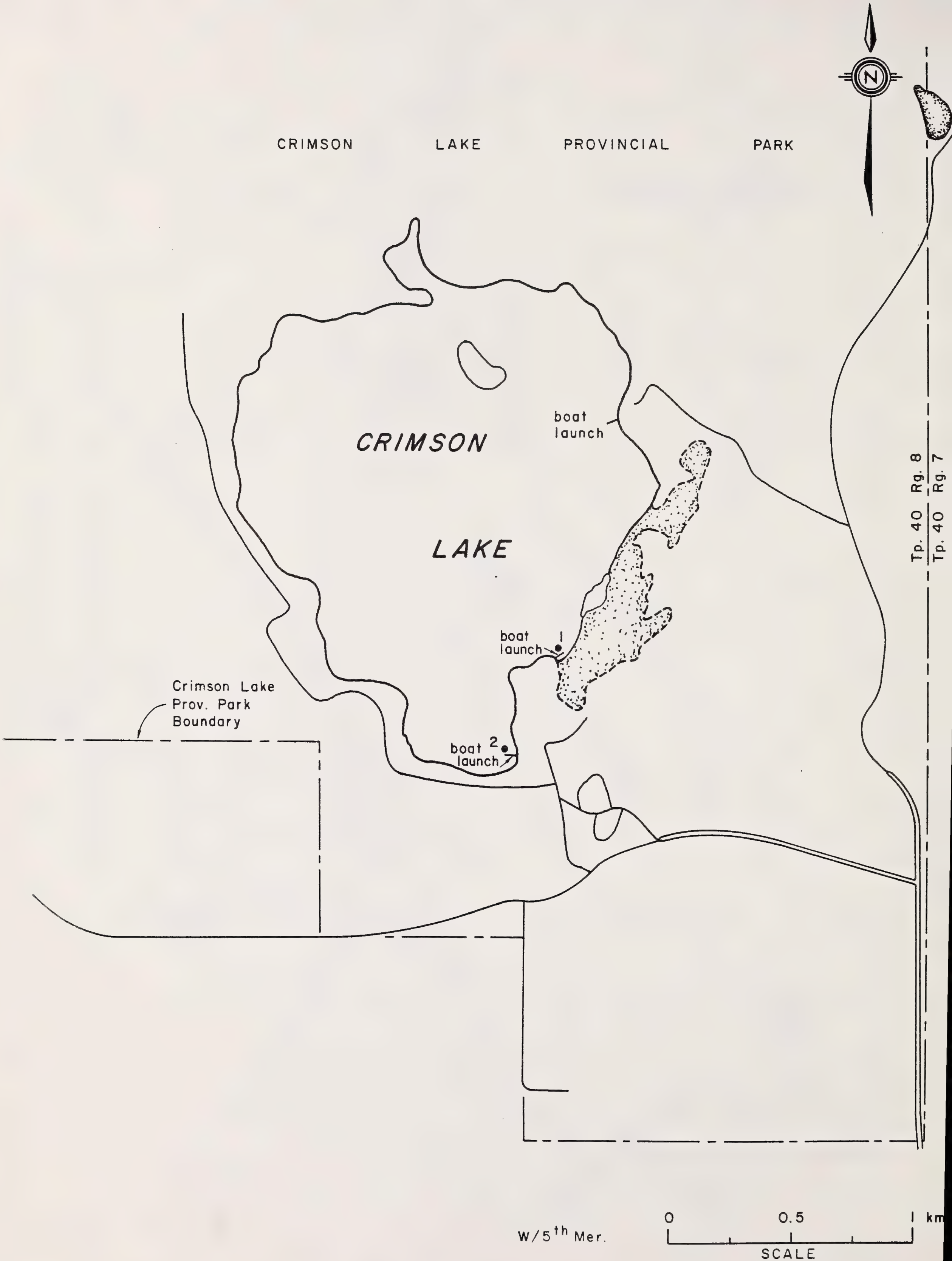

N
PIGEON
LAKE
Fifth Meridian
Rg. 1
Rg. 28
Mulhurst
1 public boat launch
campsite
Pigeon Lake I. R. 138 A
wharf
2
Ma-Me-O Beach
Prov. Park
13
3 boat launch
Pigeon Lake Prov. Park
Rg. 1
Rg. 2
boat launch
5
4 at bridge crossing
Zeiner Park
Tp. 47
Tp. 46
SCALE
0
1
2
3
4 km

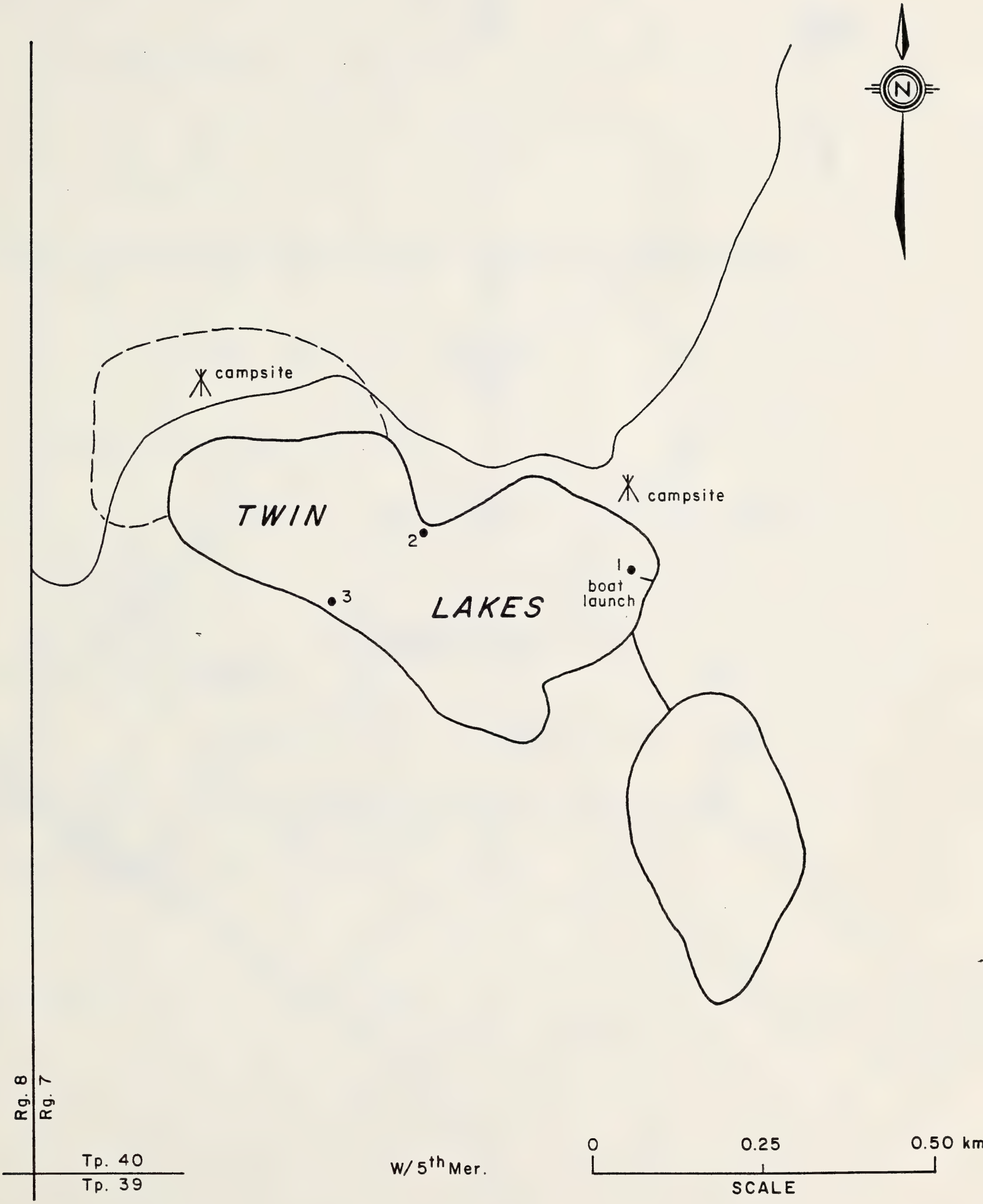

Rg. 6
Rg. 5
Tp. 47
Tp. 46
Rg. 6
Rg. 5
N
BUCK
LAKE
Buck Lake
Campsite
1
Mink Creek
0
1
SCALE

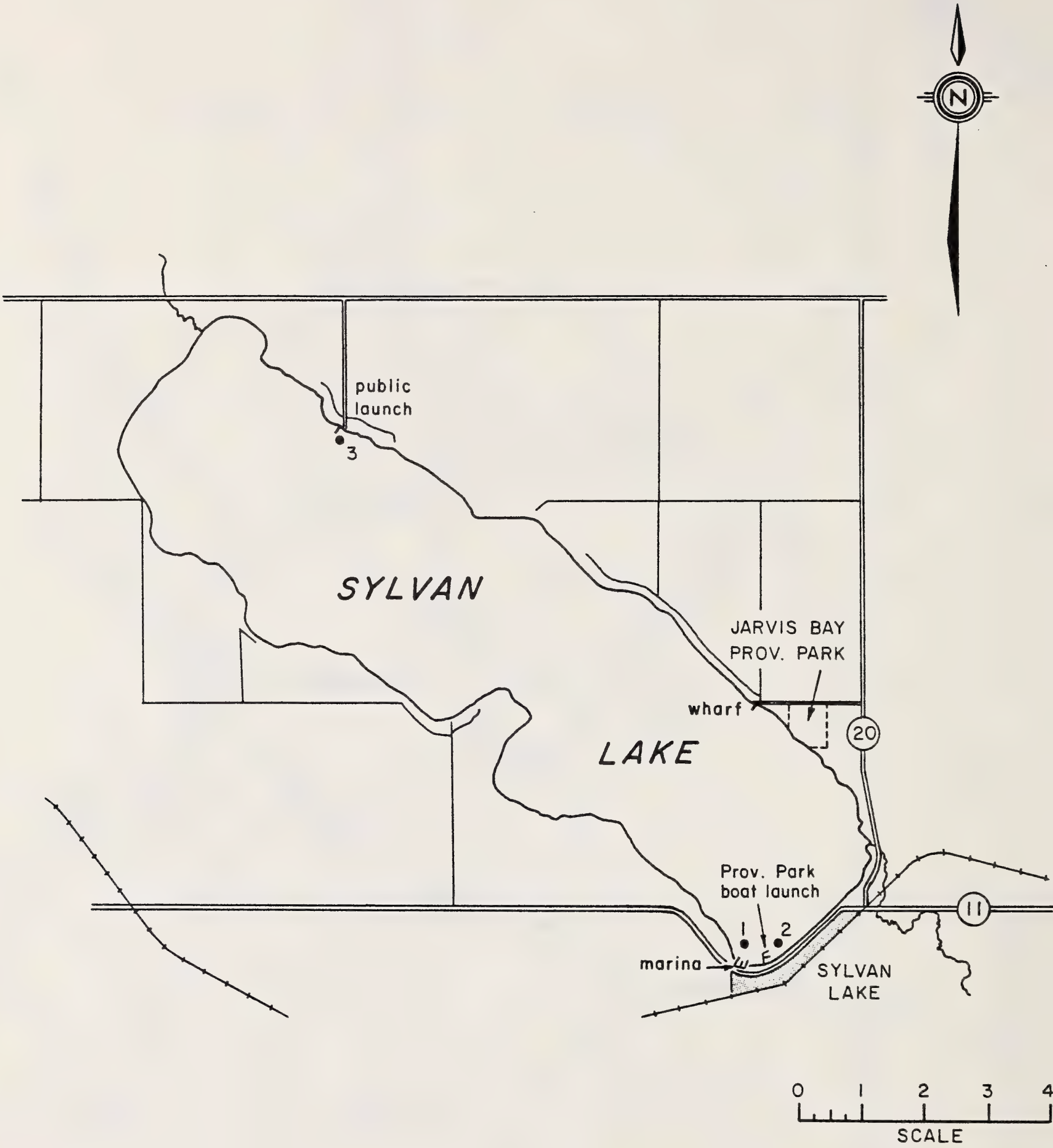

Rg. 1
Rg. 28
Fifth Meridian
Tp. 42
Tp. 41
Birch Bay
1
GULL
LAKE
12
Tp. 41
Tp. 40
Aspen Beach Prov. Park
2
wharves
12
Bentley
0
1
2
3
4 km
SCALE
N

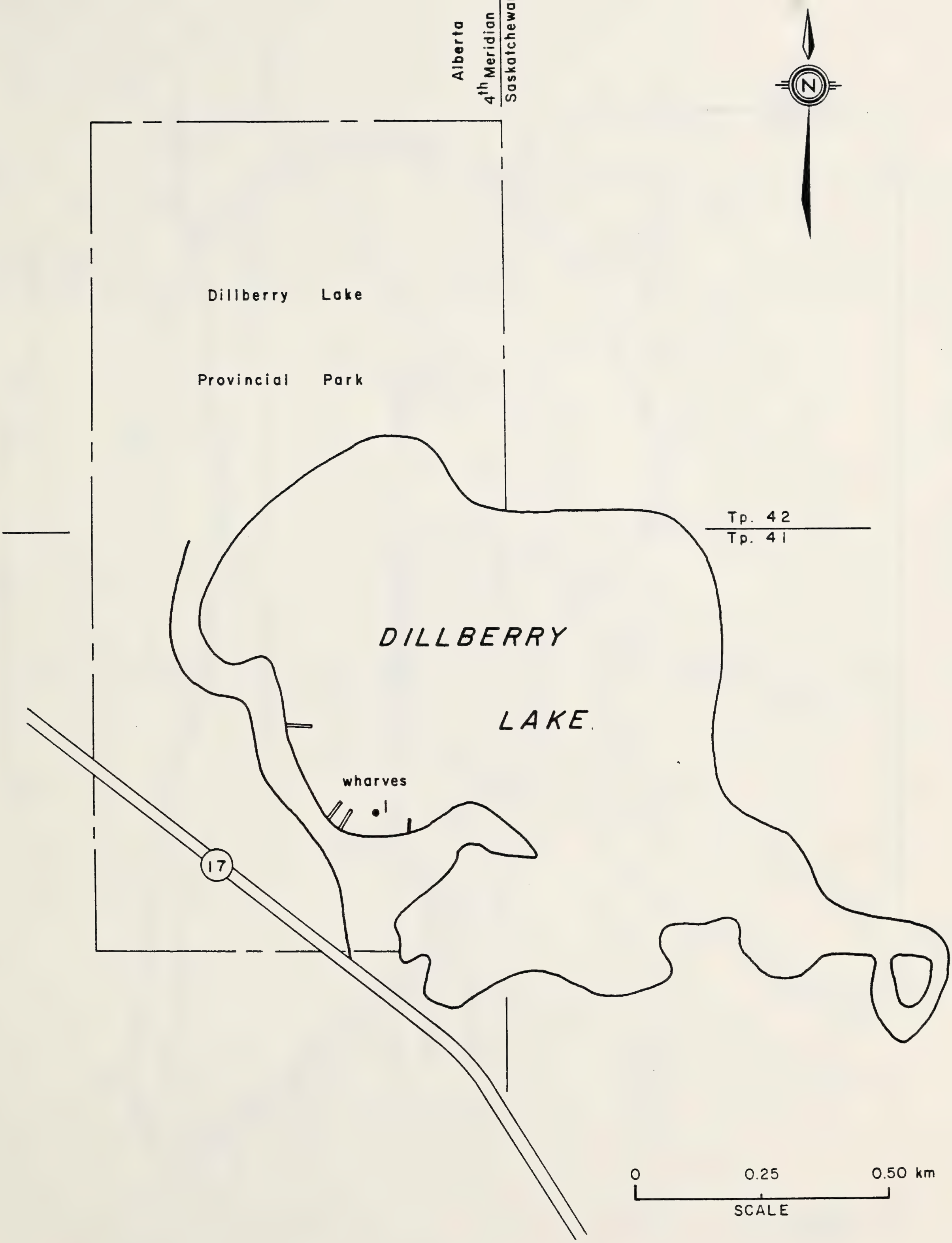

N
Bashaw
953
605
Rg. 20
Rg. 21
Rg. 21
Rg. 22
21
21
Tp. 41
Tp. 40
Parlby Cr.
1
Park
BUFFALO
LAKE
Rochon Sands
Prov. Park
2
Pelican
Point
3
4
X campsite
W/5th Mer.
0
1
2
3
4 km
SCALE

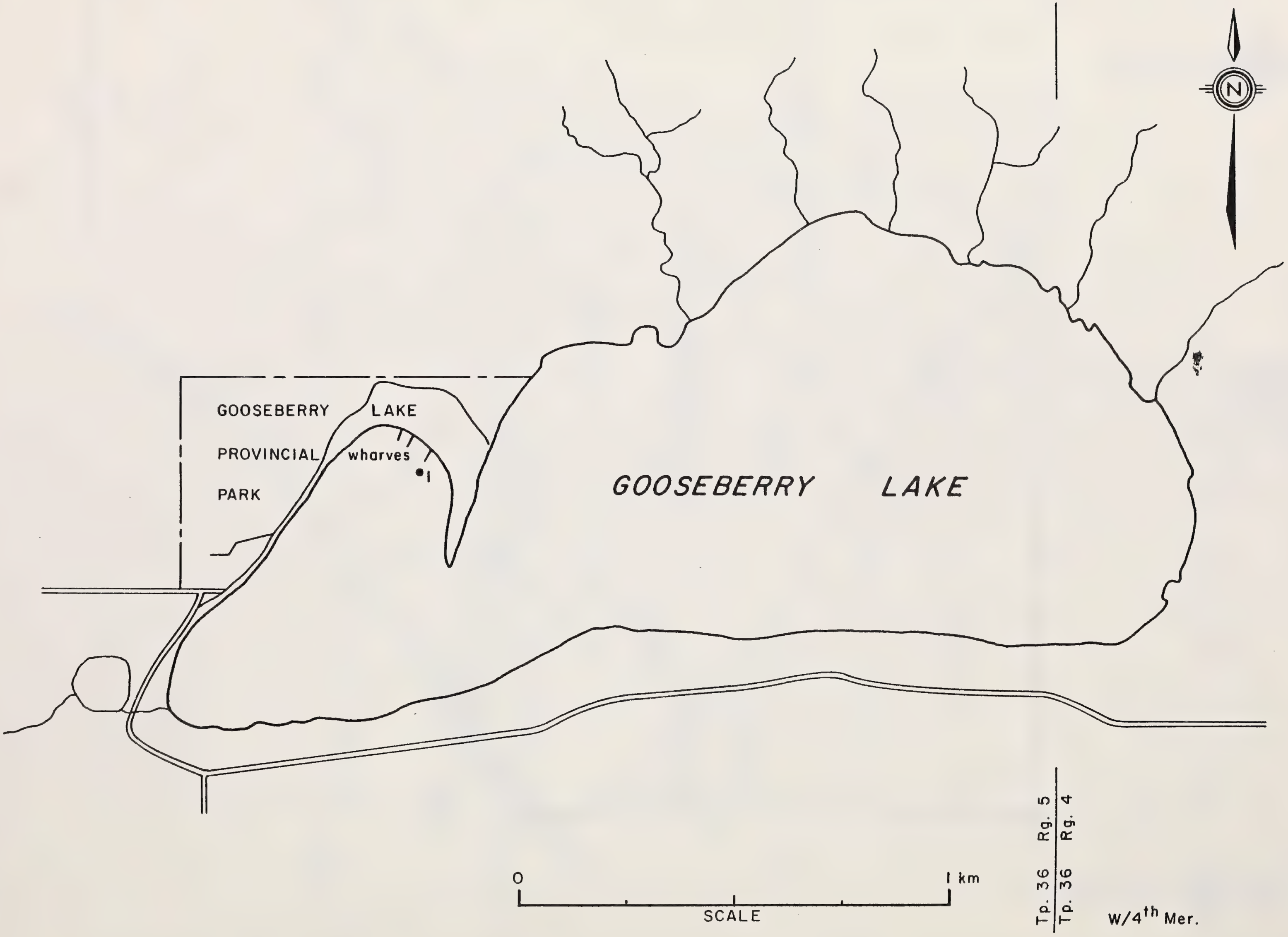

N
JACKFISH LAKE
campsite
1
11
0
0.25
0.50 km
SCALE
Tp. 41 Rg. 11 W/5th Mer.

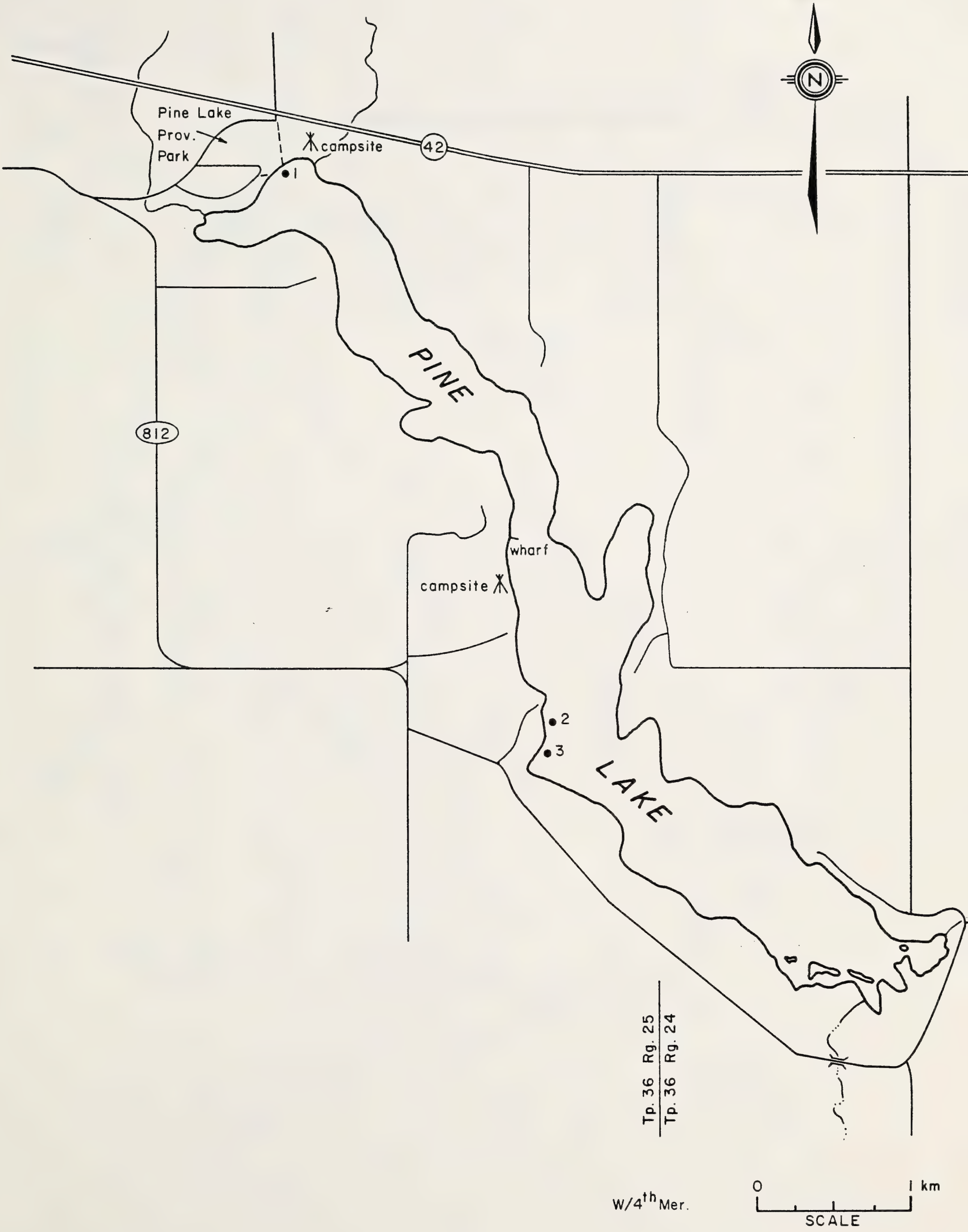

CRIMSON LAKE PROVINCIAL PARK
N
CRIMSON LAKE
boat launch
boat launch 1
boat launch 2
Crimson Lake Prov. Park Boundary
Tp. 40 Rg. 8
Tp. 40 Rg. 7
W/5th Mer.
0
0.5
1 km
SCALE

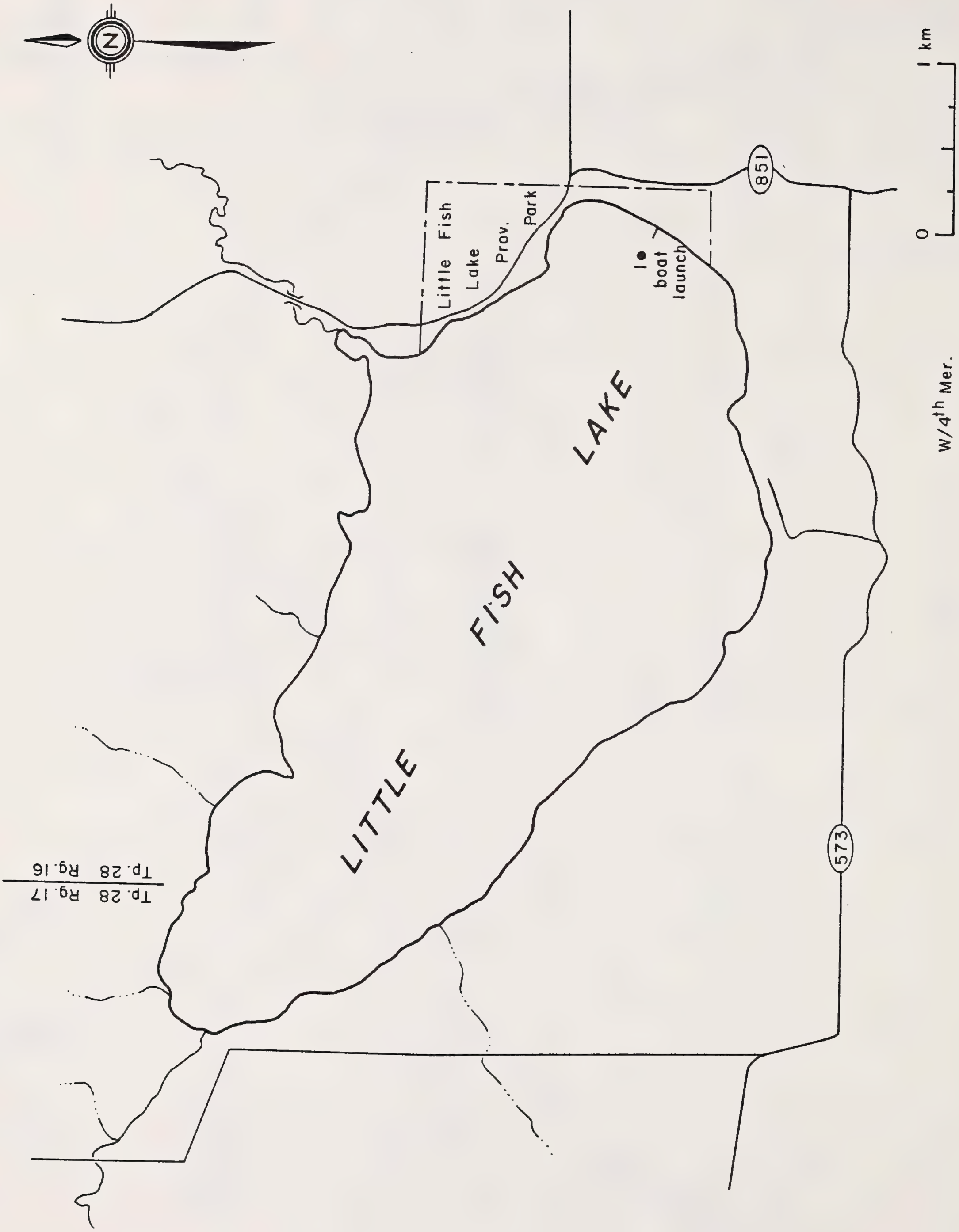

campsite
campsite
TWIN
LAKES
1
2
3
boat launch
Rg. 8
Rg. 7
Tp. 40
Tp. 39
W/5th Mer.
0
0.25
0.50 km
SCALE
N


N
public launch
3
SYLVAN
JARVIS BAY PROV. PARK
wharf
20
LAKE
Prov. Park boat launch
1
2
11
marina
SYLVAN LAKE
0
1
2
3
4
SCALE

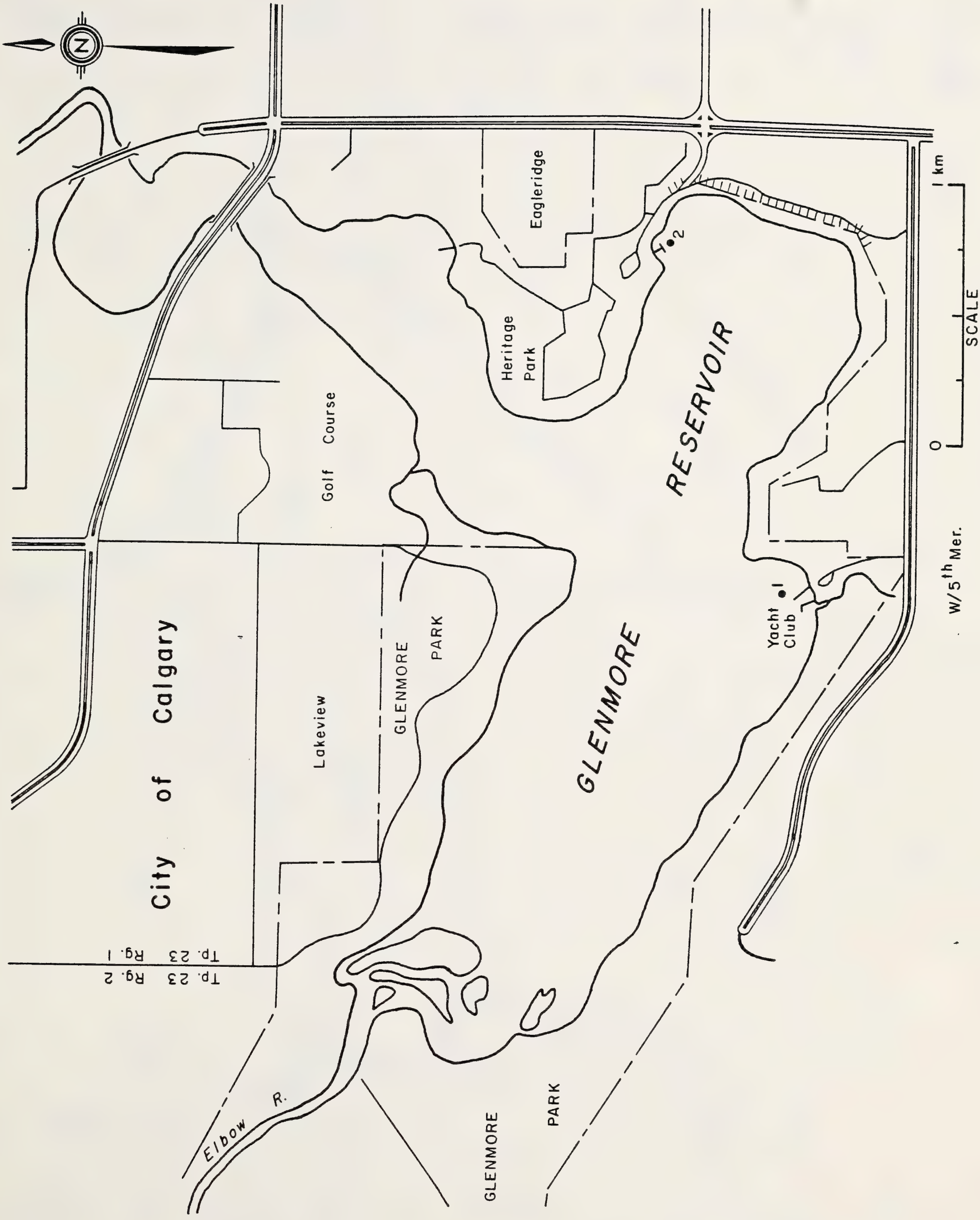

Alberta
4th Meridian
Saskatchewa
N
Dillberry Lake
Provincial Park
Tp. 42
Tp. 41
DILLBERRY
LAKE
wharves
1
17
0
0.25
0.50 km
SCALE

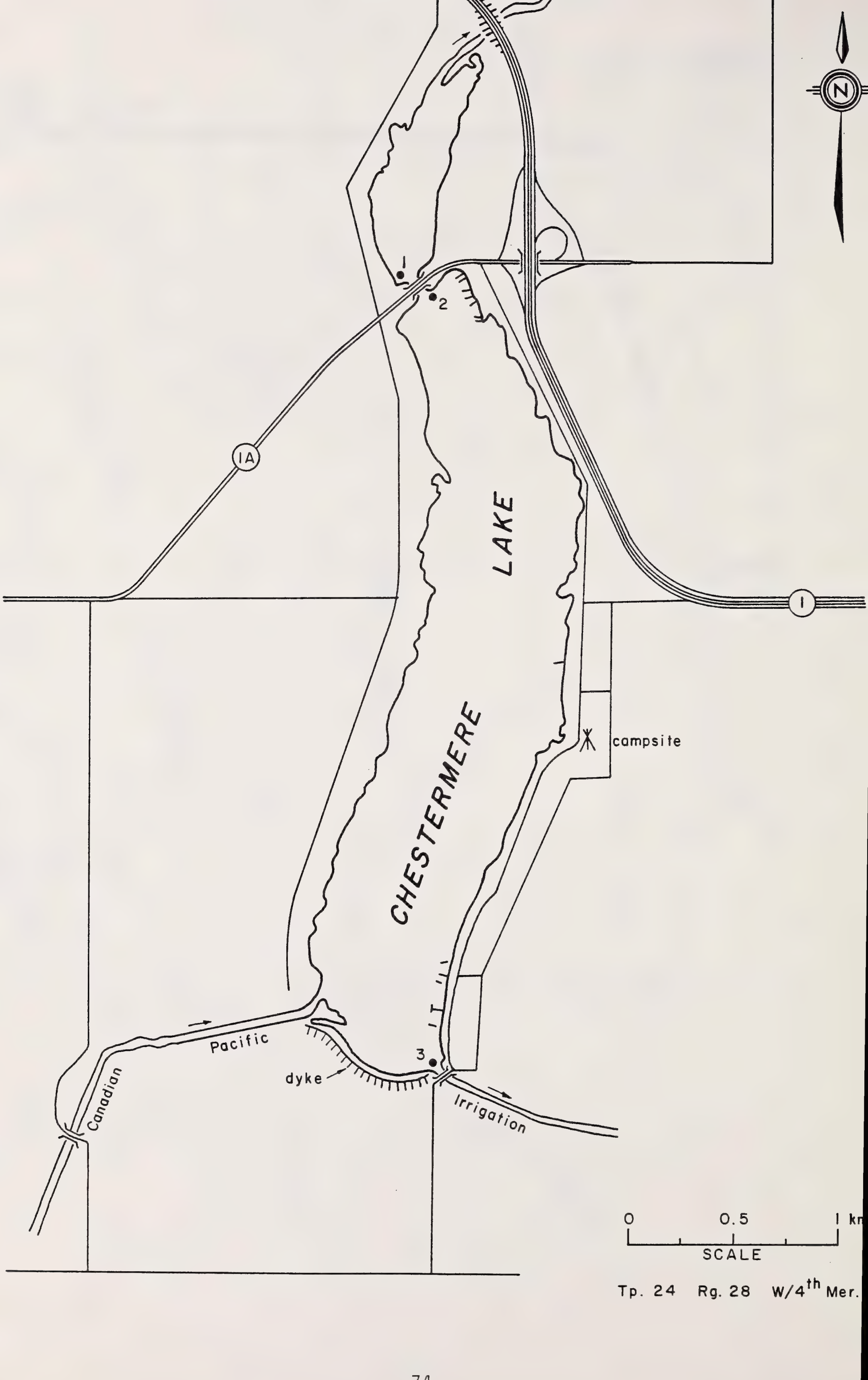

N
GOOSEBERRY LAKE
GOOSEBERRY LAKE PROVINCIAL PARK
wharves
1
0
1 km
SCALE
Tp. 36 Rg. 5
Tp. 36 Rg. 4
W/4th Mer.

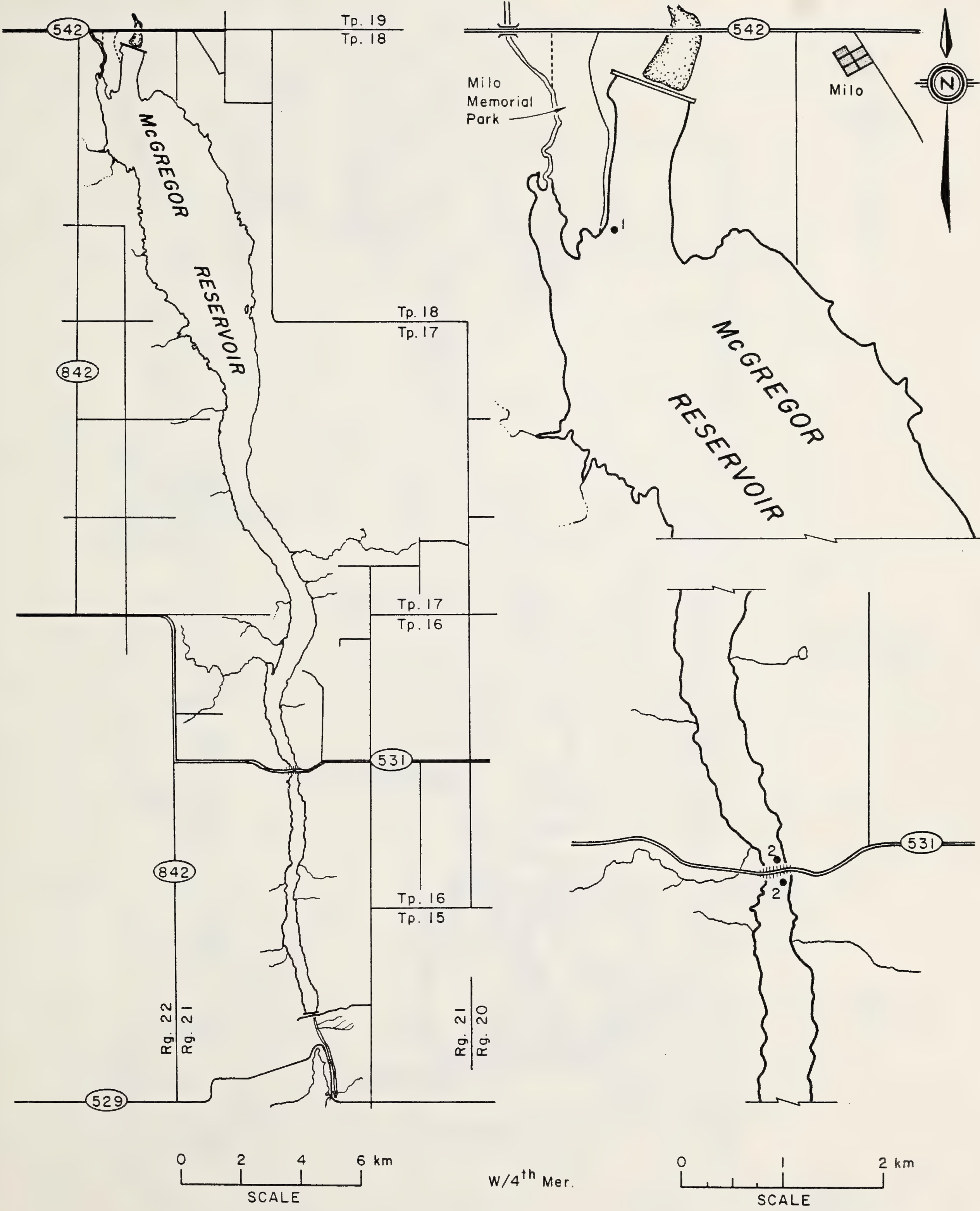

N
Pine Lake
Prov.
Park
campsite
42
1
PINE
812
wharf
campsite
2
3
LAKE
Tp. 36 Rg. 25
Tp. 36 Rg. 24
W/4th Mer.
0
1 km
SCALE

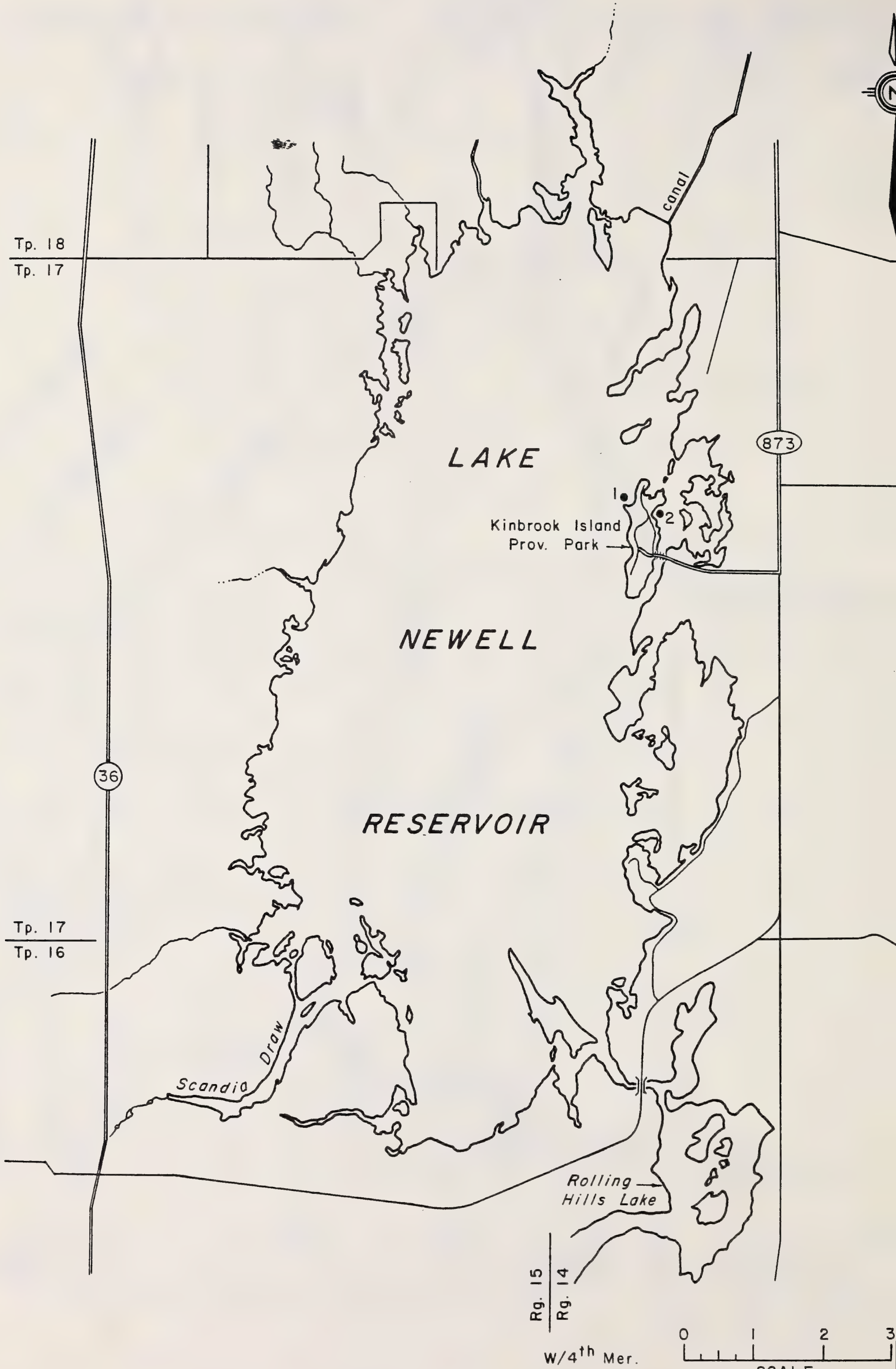


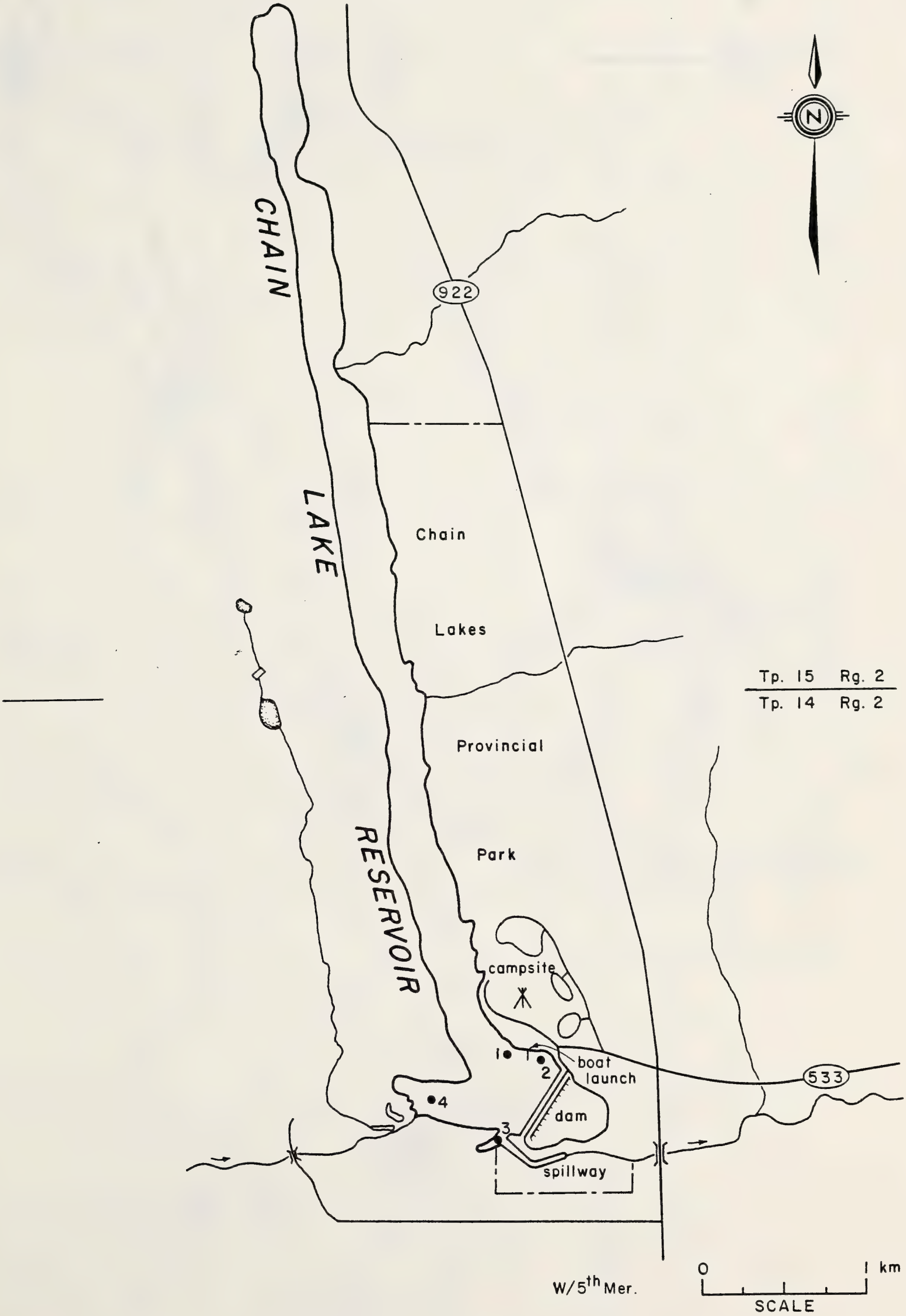
N
Little Fish Lake Prov. Park
1 boat launch
851
0
1 km
LITTLE FISH LAKE
W/4th Mer.
Tp.28 Rg.17
Tp.28 Rg.16
573

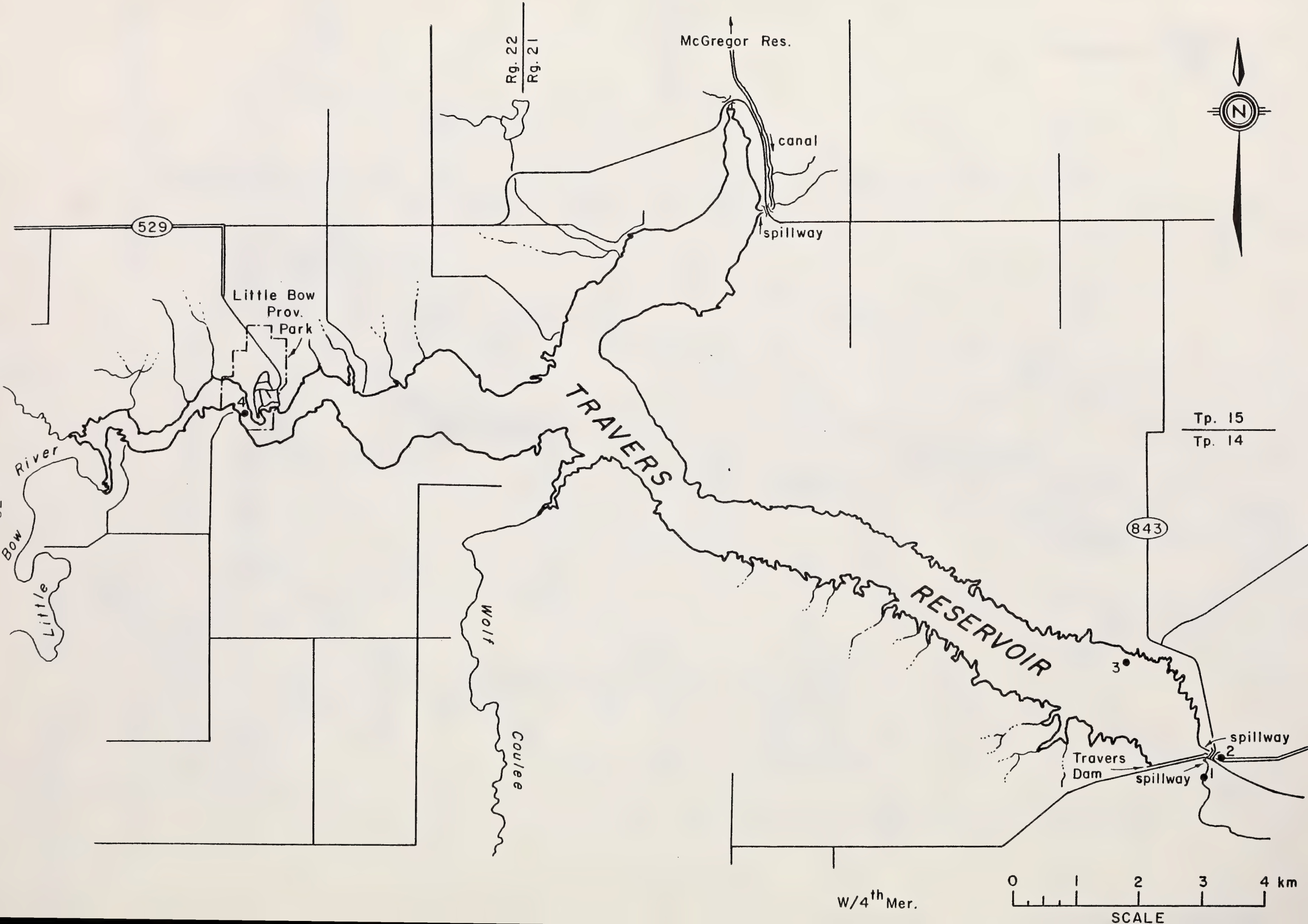

N
City of Calgary
Tp. 23 Rg. 1
Tp. 23 Rg. 2
Lakeview
Golf Course
Heritage Park
Eagleridge
GLENMORE PARK
GLENMORE RESERVOIR
Yacht Club
1
2
Elbow R.
GLENMORE PARK
W/5th Mer.
0
1 km
SCALE

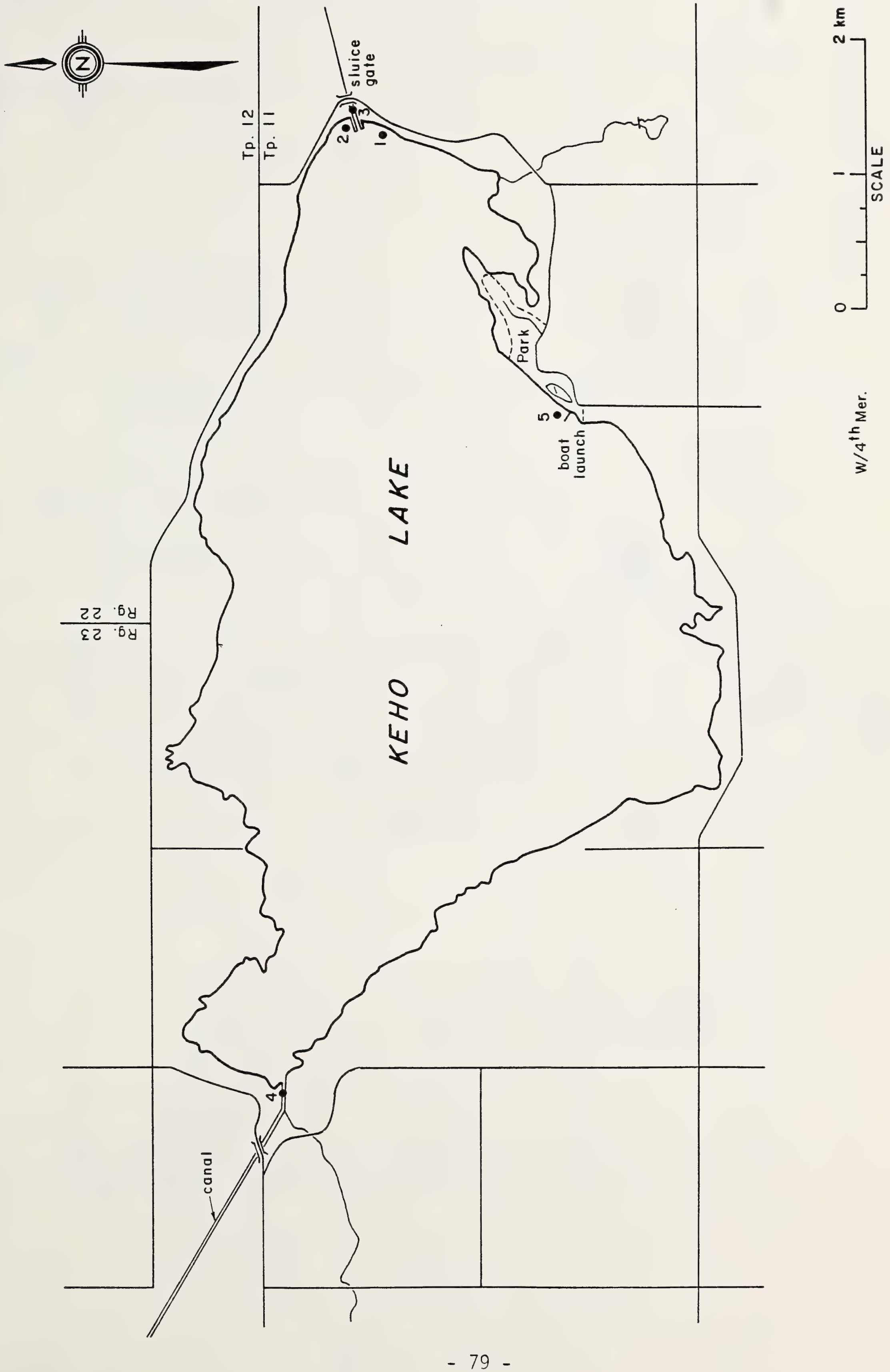

N
1
2
1A
LAKE
1
CHESTERMERE
campsite
Pacific
Canadian
dyke
3
Irrigation
0
0.5
1 k
SCALE
Tp. 24 Rg. 28 W/4th Mer.

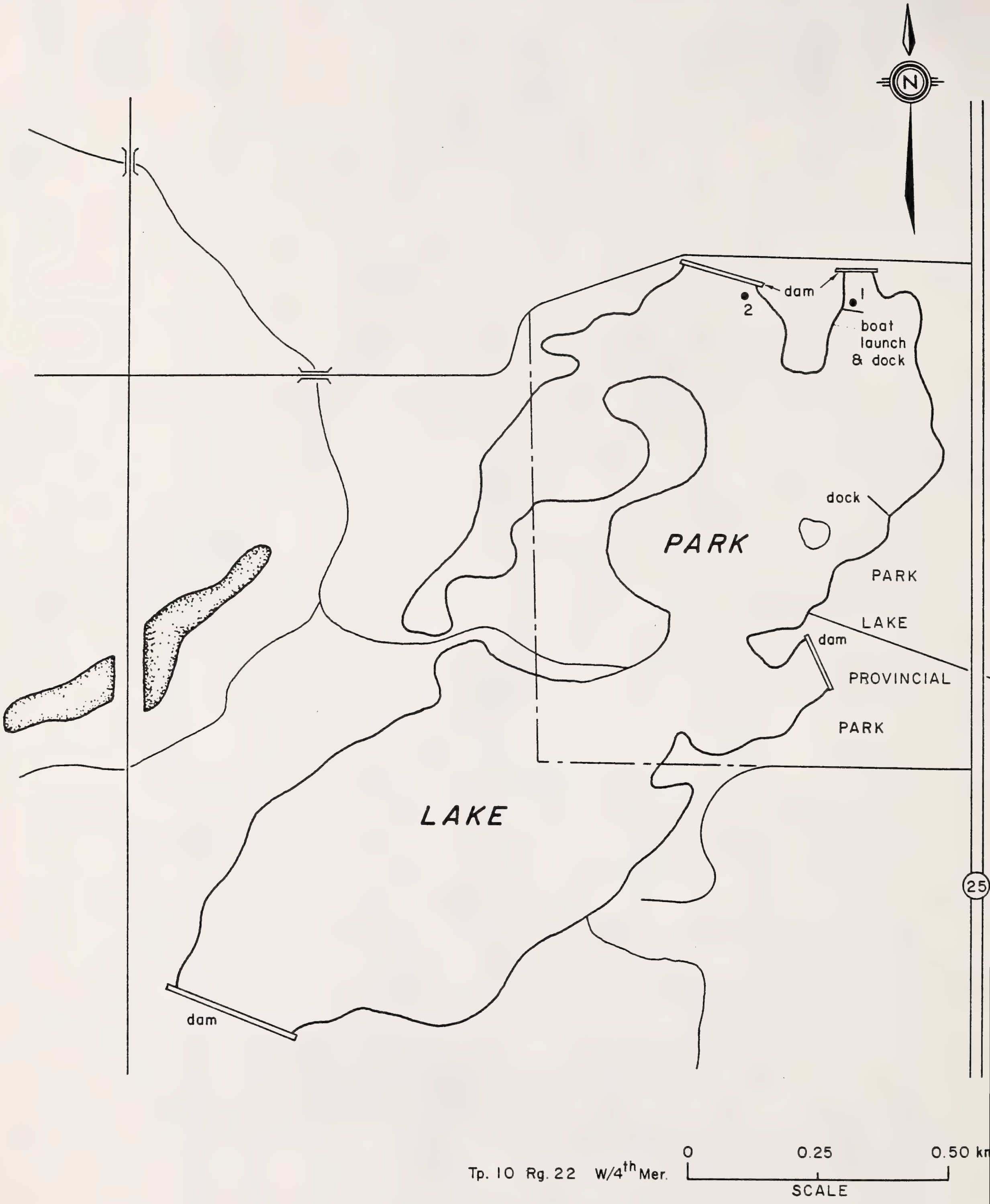

542
Tp. 19
Tp. 18
McGREGOR
RESERVOIR
Tp. 18
Tp. 17
842
Tp. 17
Tp. 16
531
842
Tp. 16
Tp. 15
Rg. 22
Rg. 21
Rg. 21
Rg. 20
529
0
2
4
6 km
SCALE
W/4th Mer.
542
Milo
Memorial
Park
Milo
N
1
McGREGOR
RESERVOIR
2
2
531
0
1
2 km
SCALE

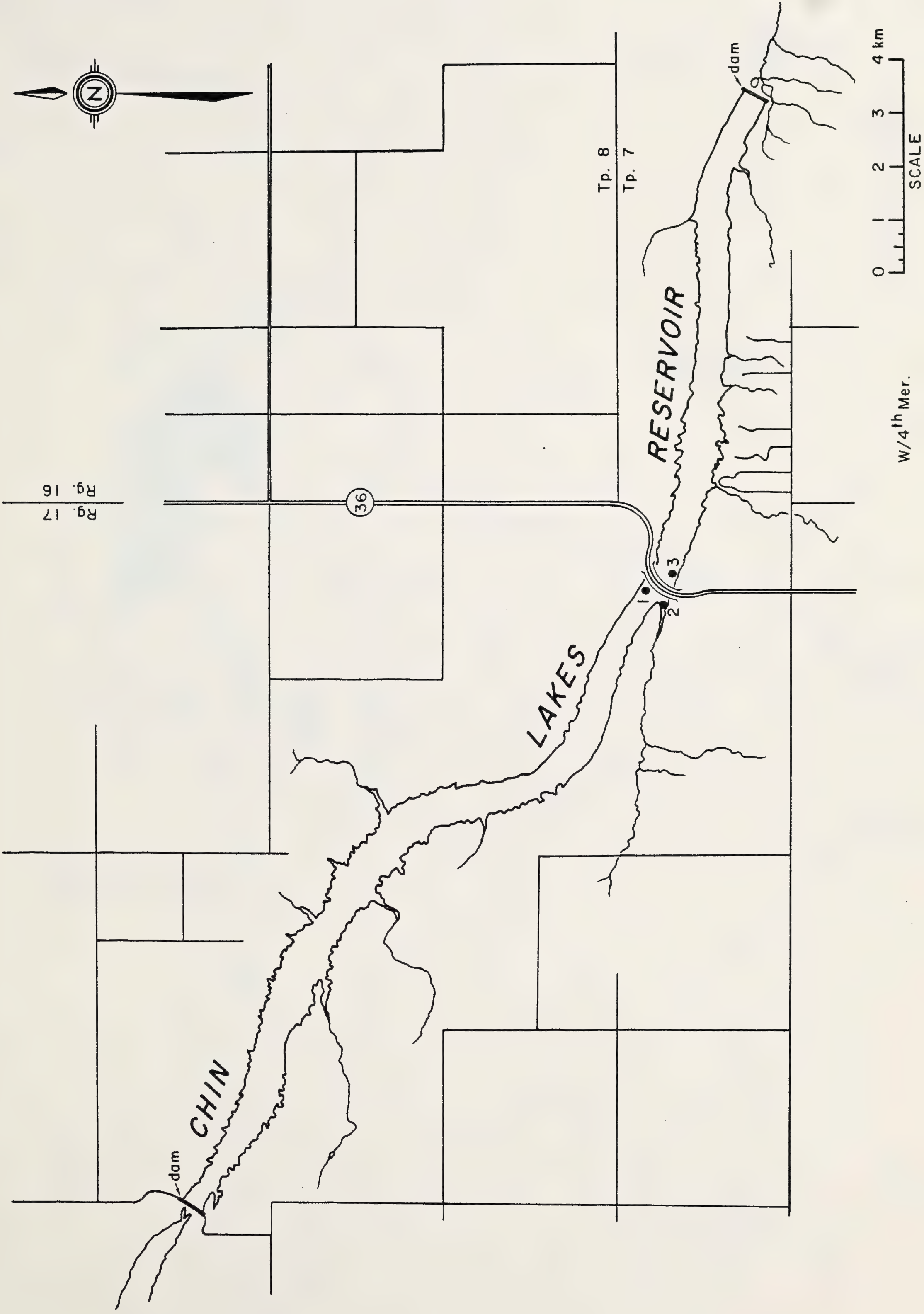

Tp. 18
Tp. 17
canal
LAKE
NEWELL
RESERVOIR
873
1
2
Kinbrook Island
Prov. Park
36
Tp. 17
Tp. 16
Scandia Draw
Rolling Hills Lake
Rg. 15
Rg. 14
W/4th Mer.
0
1
2
3
SCALE

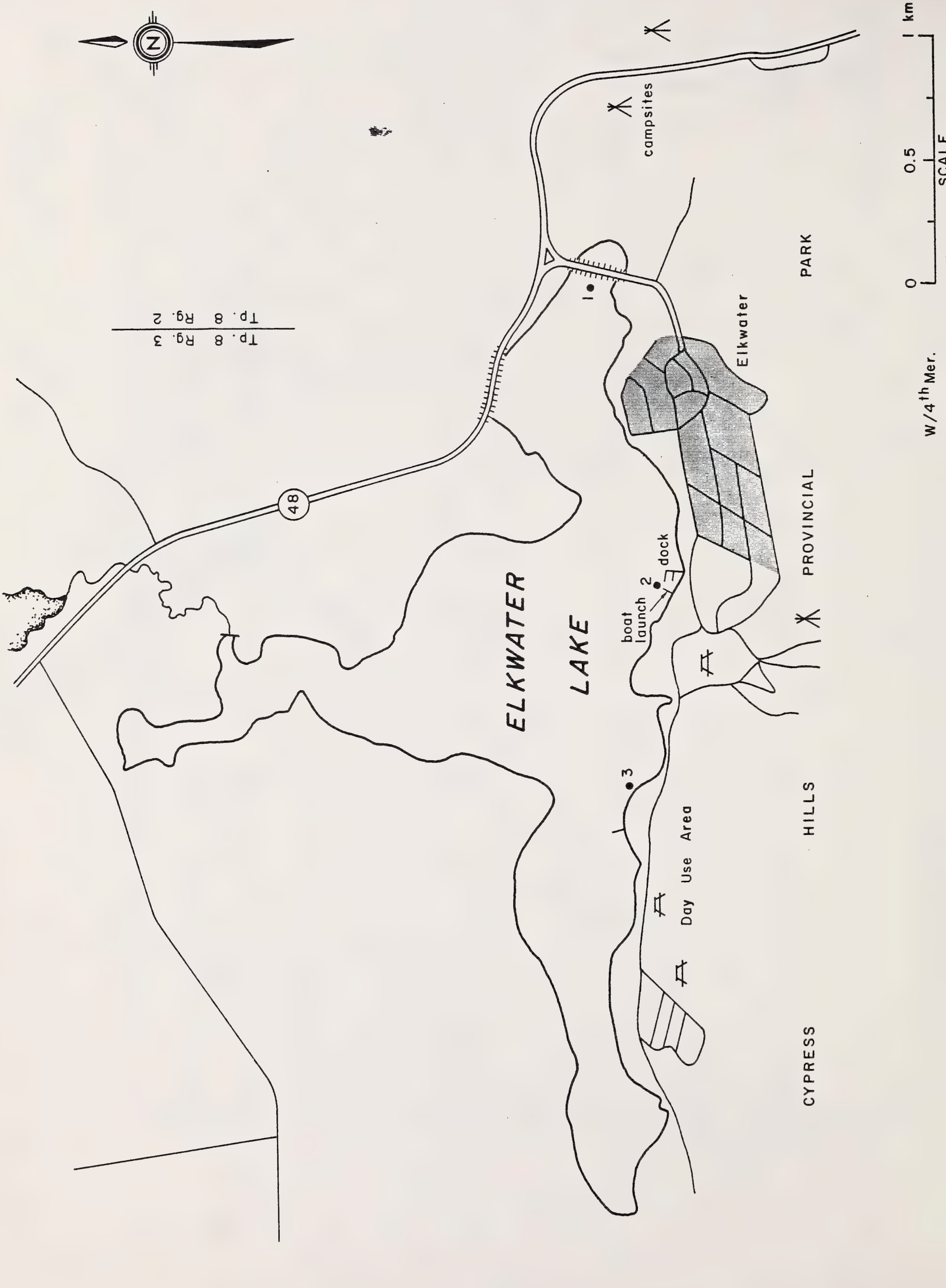

CHAIN
LAKE
RESERVOIR
922
Chain
Lakes
Provincial
Park
campsite
boat
launch
dam
spillway
1
2
3
4
533
Tp. 15 Rg. 2
Tp. 14 Rg. 2
N
W/5th Mer.
0
1 km
SCALE

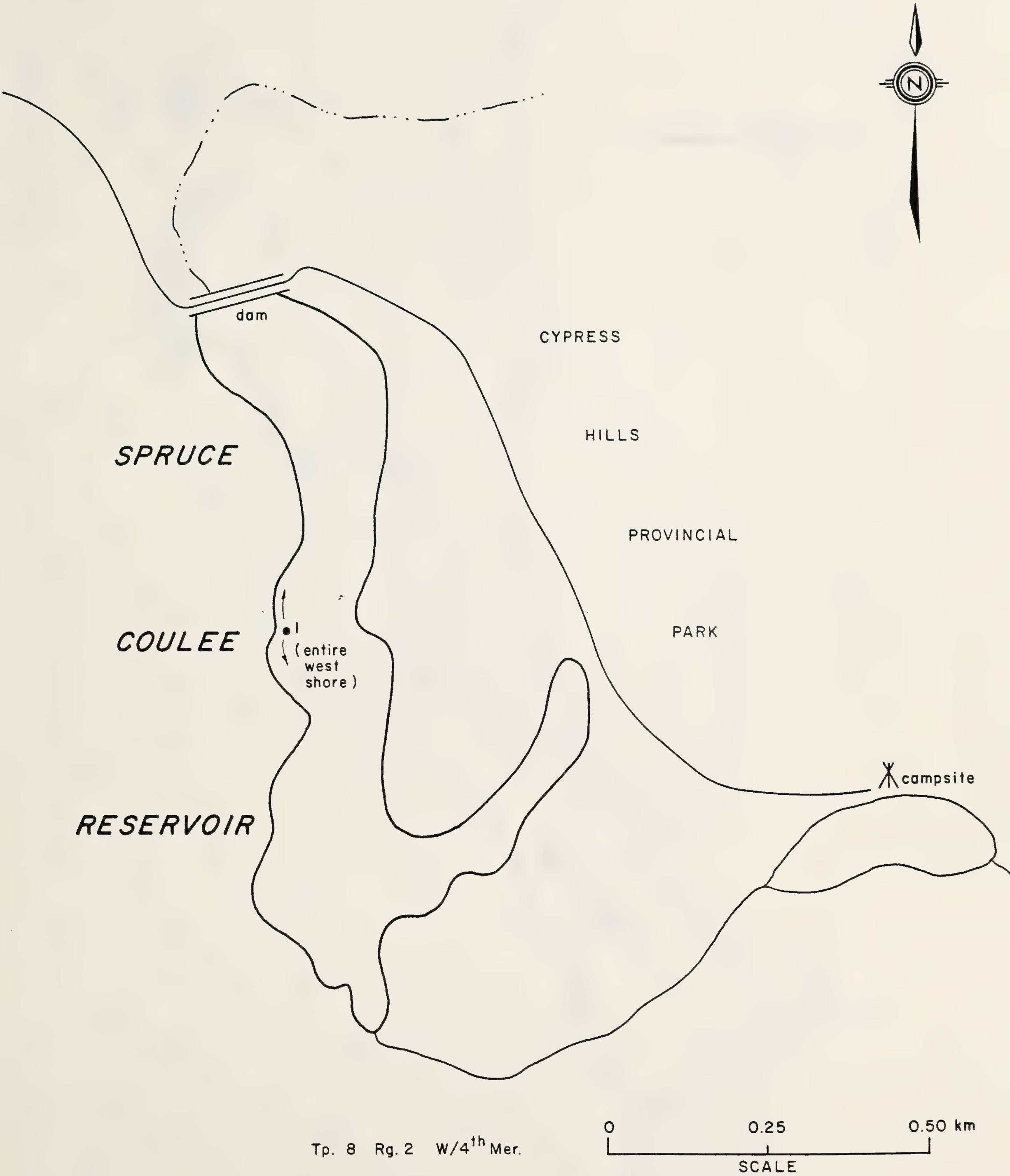

McGregor Res.
Rg. 22
Rg. 21
canal
spillway
529
Little Bow
Prov.
Park
4
River
Bow
Little
TRAVERS
RESERVOIR
Wolf
Coulee
843
Tp. 15
Tp. 14
3
spillway
2
Travers
Dam
spillway
1
W/4th Mer.
0
1
2
3
4 km
SCALE

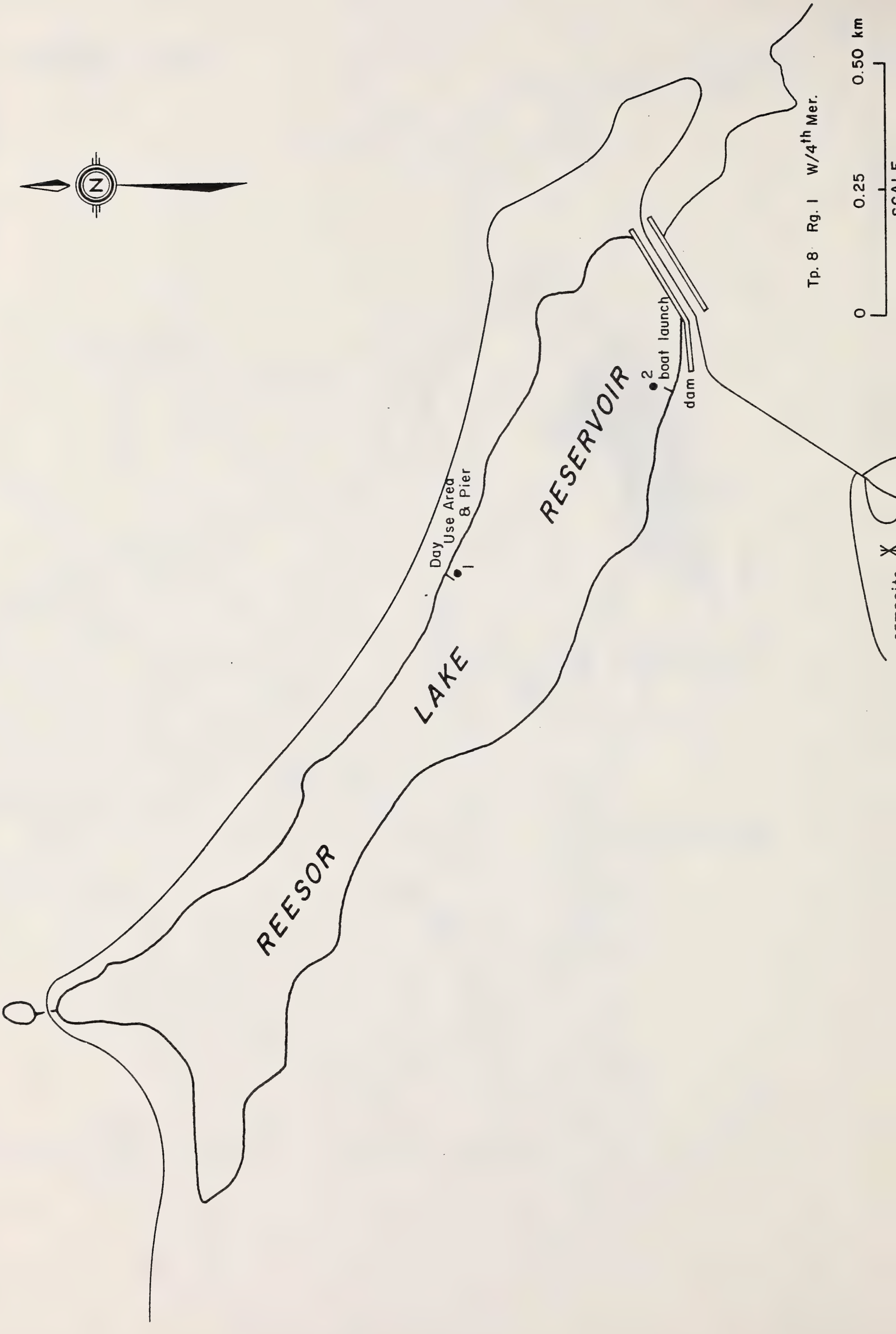

N
sluice gate
1
2
3
4
5
Tp. 12
Tp. 11
Rg. 22
Rg. 23
KEHO LAKE
Park
boat launch
canal
W/4th Mer.
0
1
2 km
SCALE

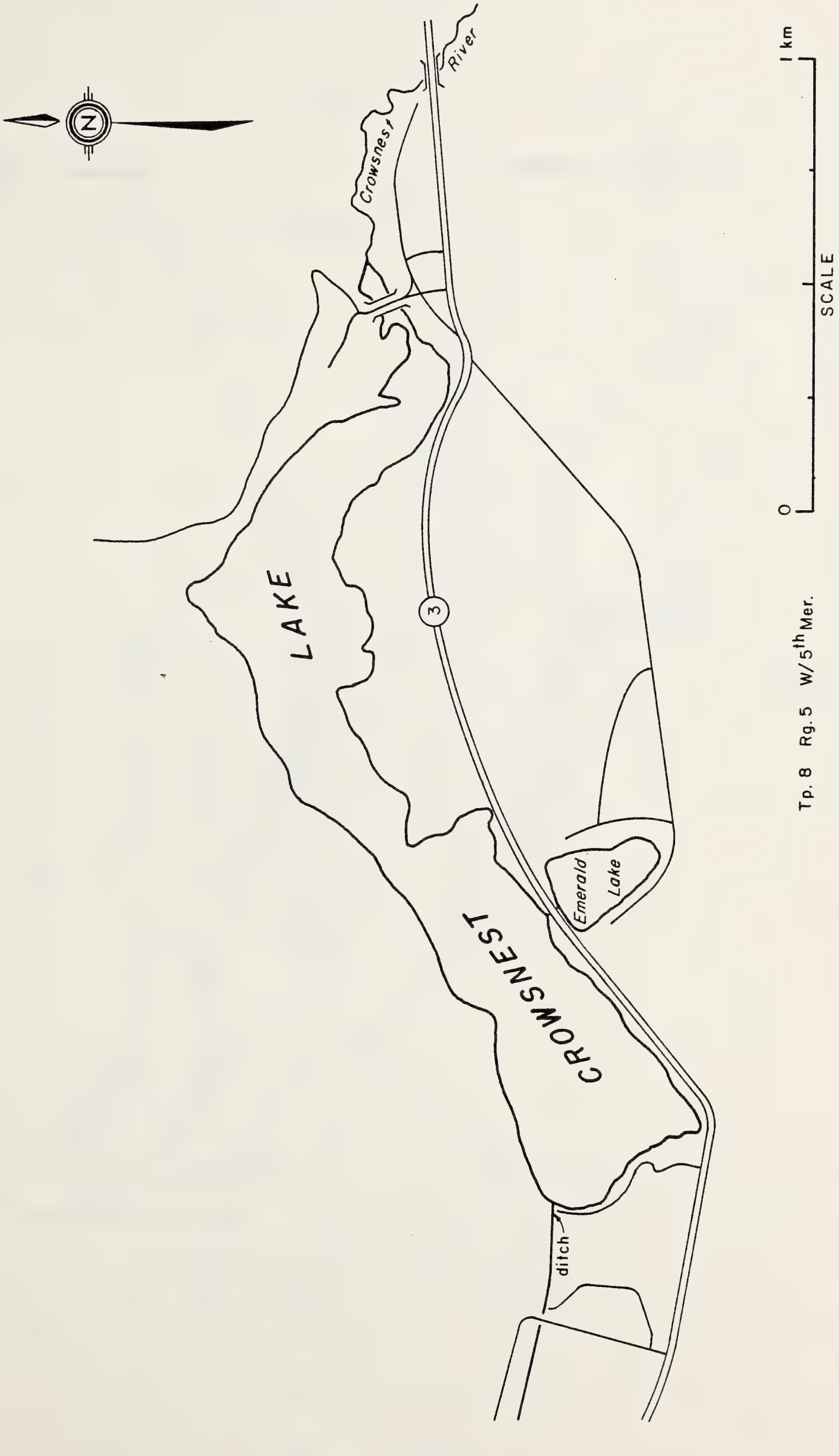

N
dam
2
1
boat launch & dock
PARK
dock
PARK
LAKE
PROVINCIAL
PARK
dam
LAKE
25
dam
Tp. 10 Rg. 22 W/4th Mer.
0
0.25
0.50 k
SCALE

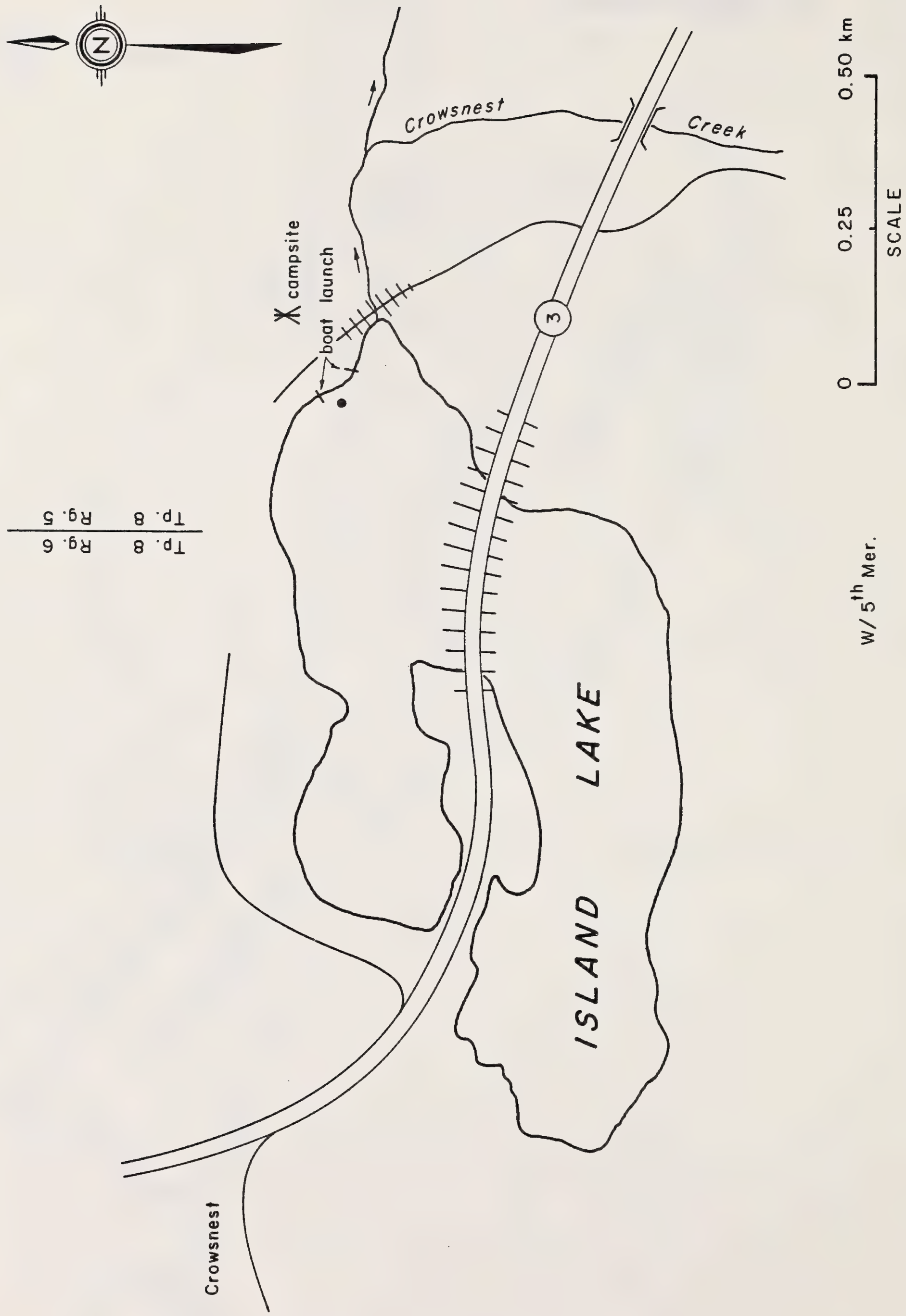

N
CHIN
LAKES
RESERVOIR
dam
dam
36
1
2
3
Tp. 8
Tp. 7
Rg. 16
Rg. 17
W/4th Mer.
0 1 2 3 4 km
SCALE

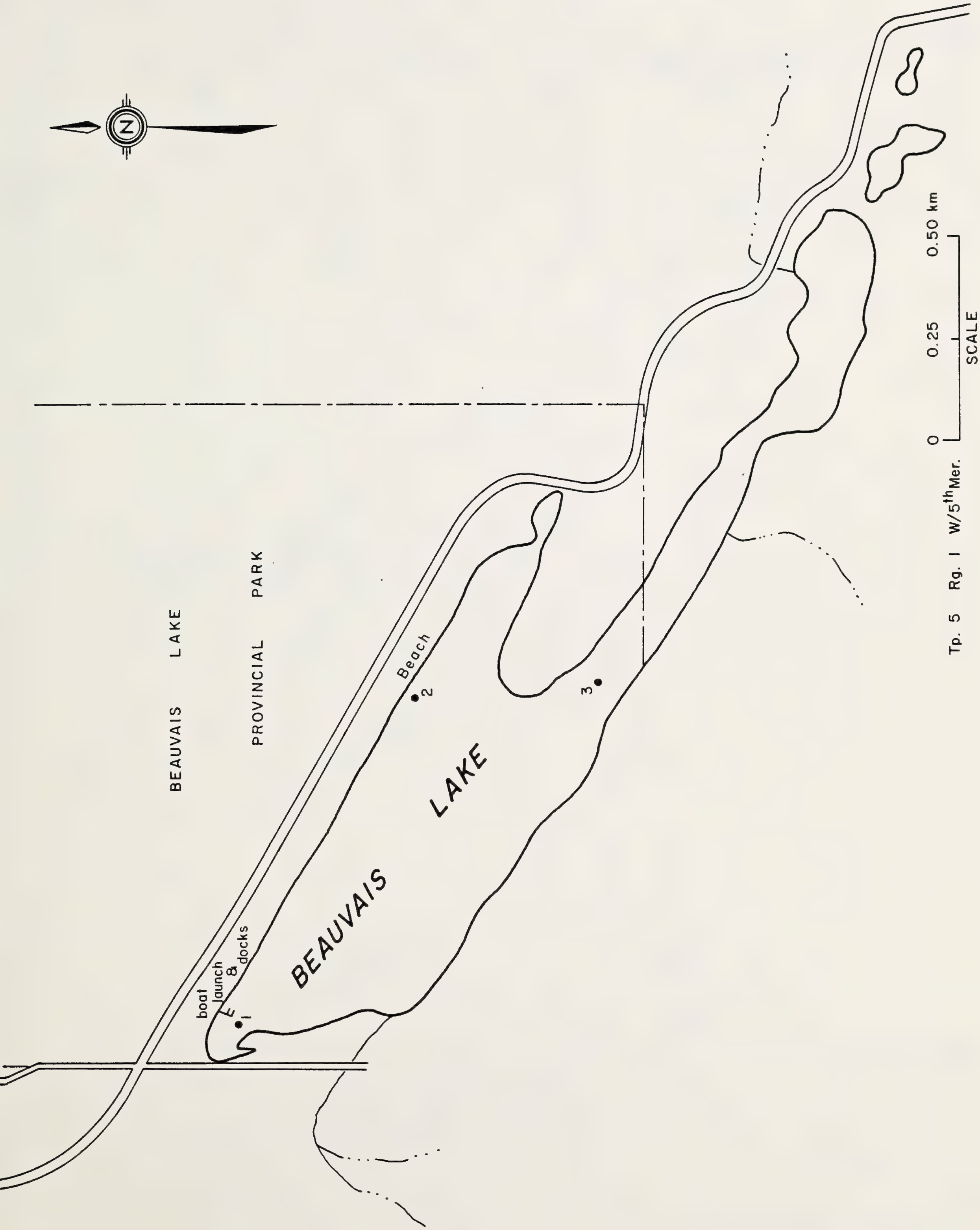

N
Tp. 8 Rg. 2
Tp. 8 Rg. 3
48
ELKWATER LAKE
Elkwater
campsites
1
2
3
dock
boat launch
Day Use Area
CYPRESS HILLS PROVINCIAL PARK
W/4th Mer.
0
0.5
1 km
SCALE

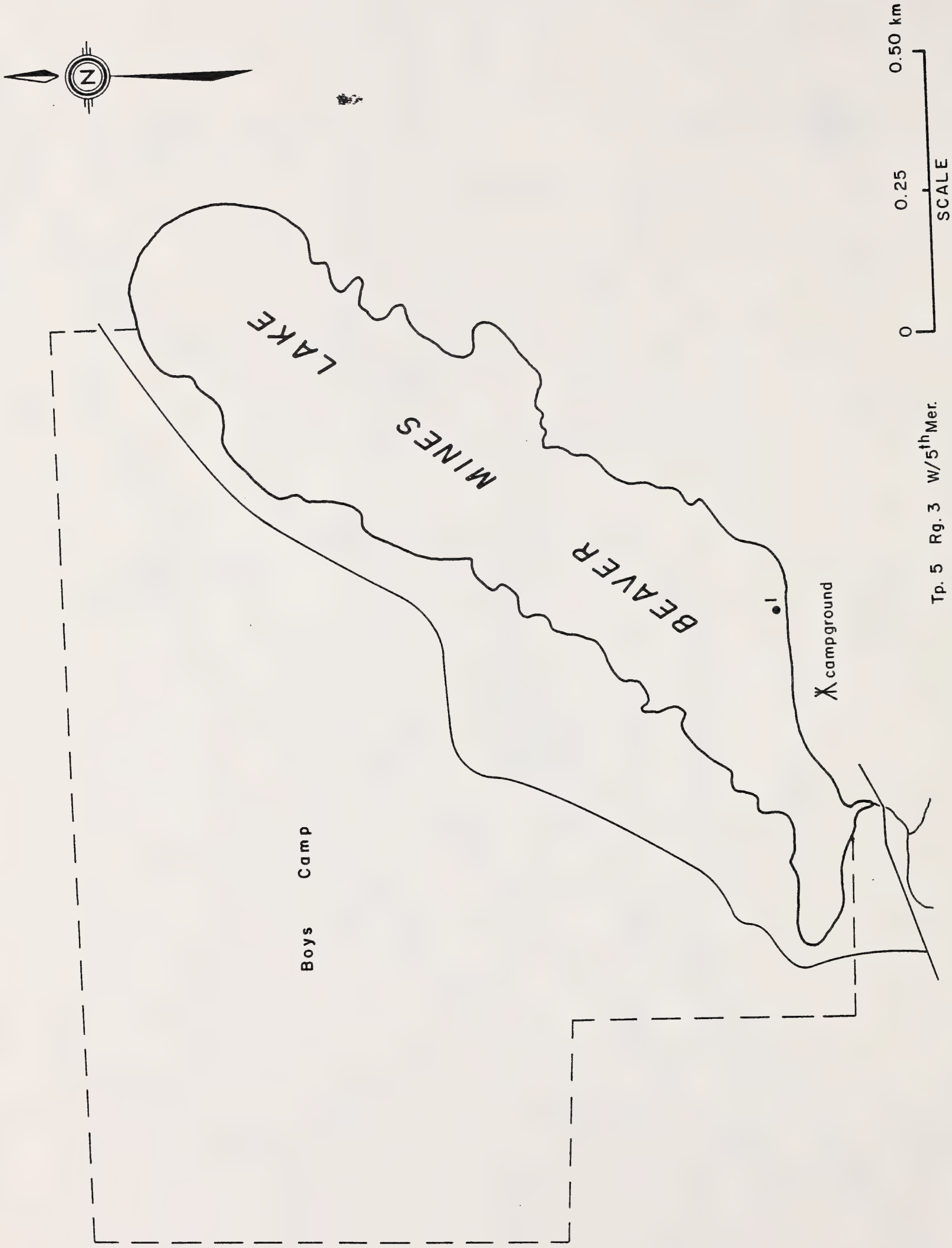

dam
CYPRESS
HILLS
PROVINCIAL
PARK
SPRUCE
COULEE
RESERVOIR
1
(entire west shore)
campsite
N
Tp. 8 Rg. 2 W/4th Mer.
0
0.25
0.50 km
SCALE

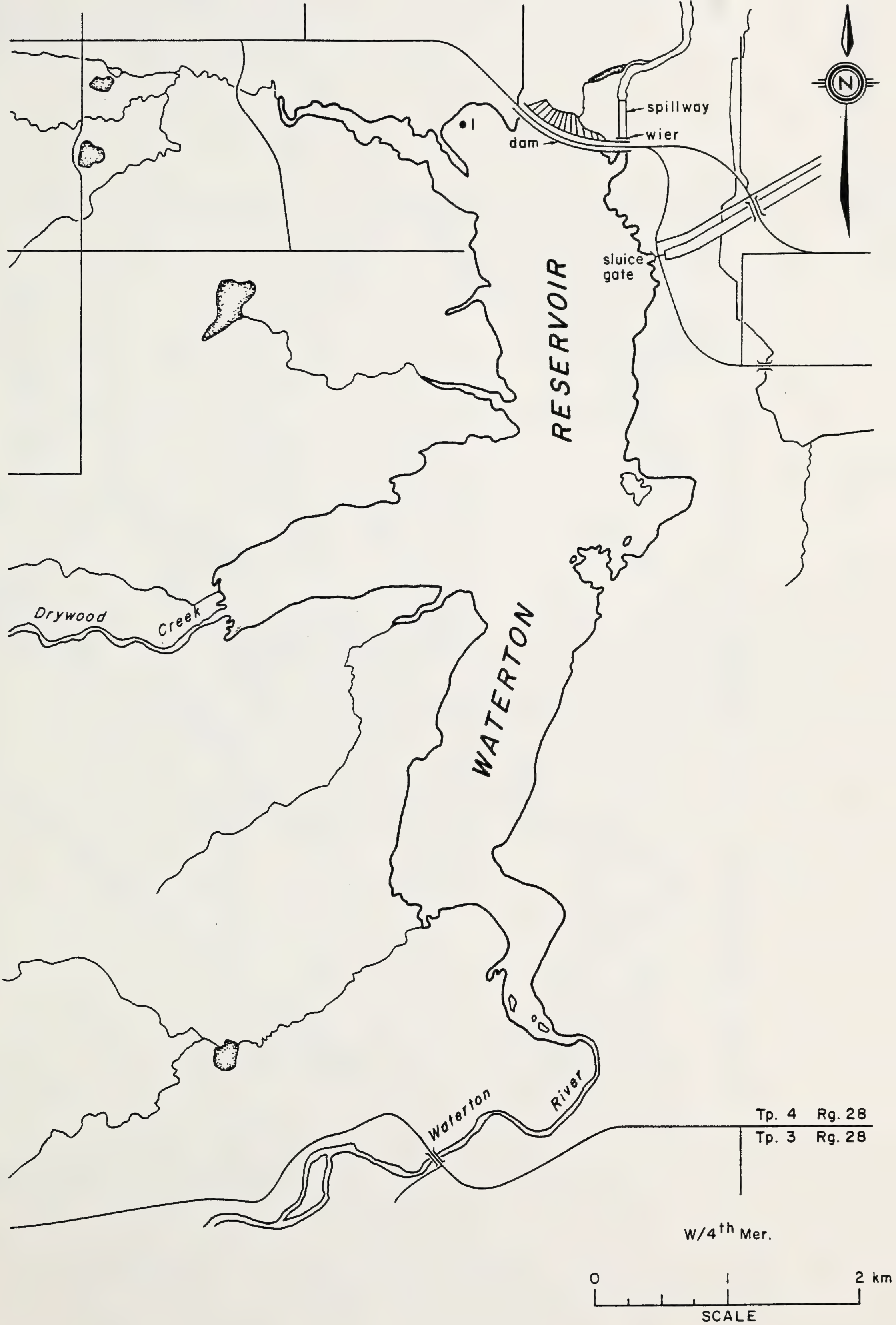

REESOR LAKE RESERVOIR
Day Use Area & Pier
1
2
boat launch
dam
Tp. 8 Rg. 1 W/4th Mer.
0
0.25
0.50 km

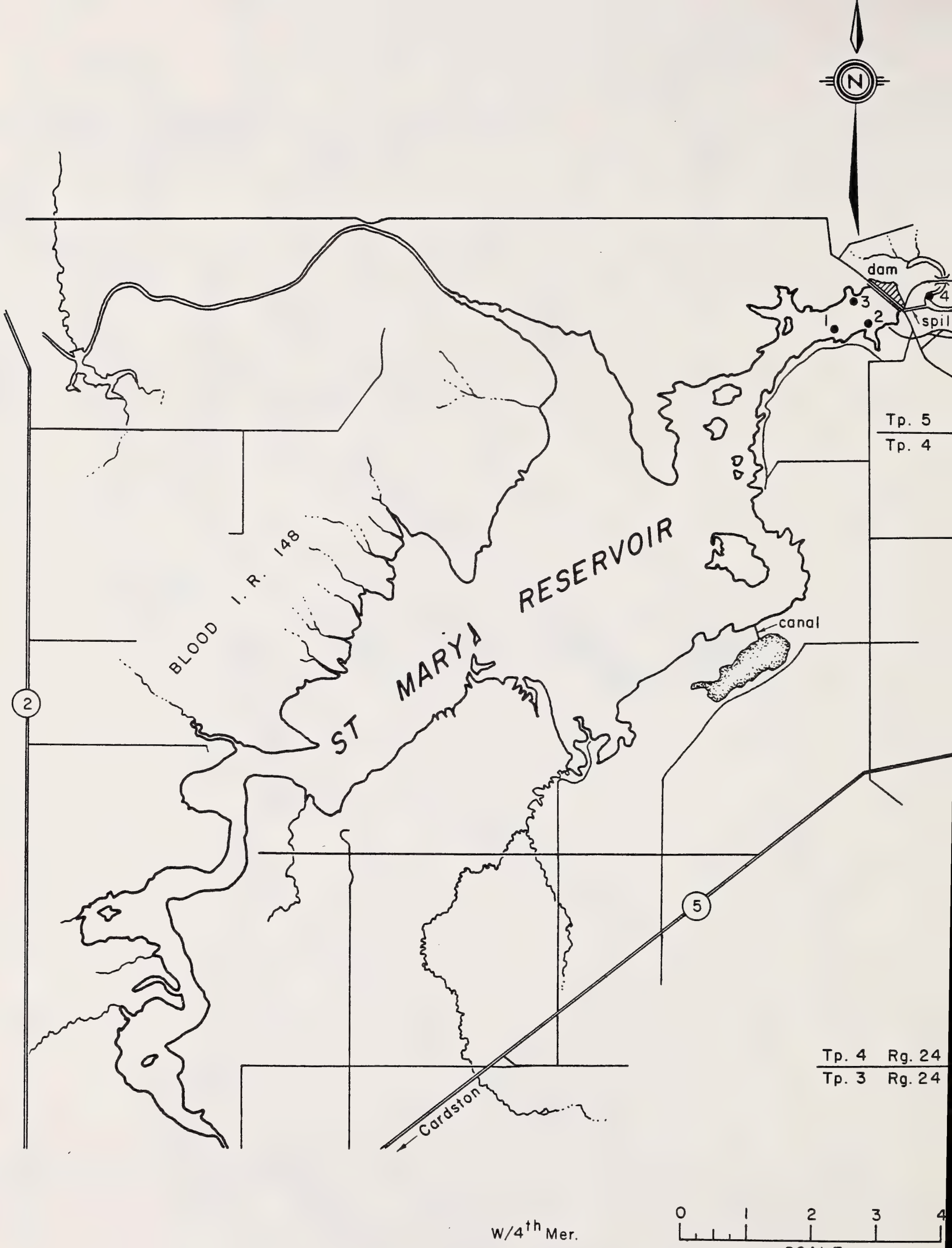

N
Crowsnest River
CROWSNEST LAKE
3
Emerald Lake
ditch
0
1 km
SCALE
Tp. 8 Rg.5 W/5th Mer.

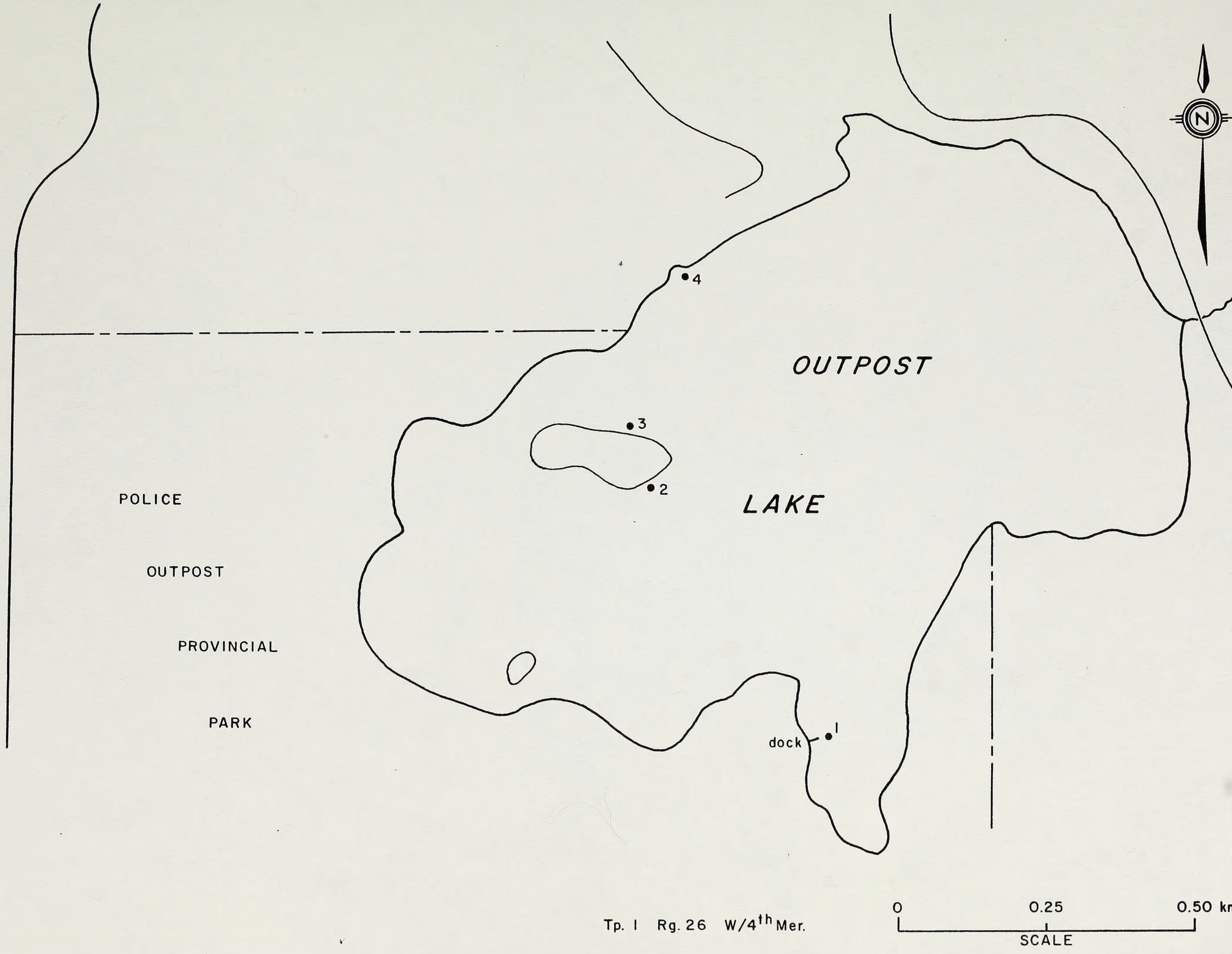

N
Crowsnest Creek
campsite
boat launch
3
Tp. 8 Rg. 5
Tp. 8 Rg. 6
ISLAND LAKE
Crowsnest
W/5th Mer.
0
0.25
0.50 km
SCALE


N
BEAUVAIS LAKE PROVINCIAL PARK
BEAUVAIS LAKE
Beach
2
3
boat launch & docks
1
0
0.25
0.50 km
SCALE
Tp. 5 Rg. 1 W/5th Mer.


N
LAKE
MINES
BEAVER
Boys Camp
1
campground
Tp. 5 Rg. 3 W/5th Mer.
0
0.25
0.50 km
SCALE


spillway
wier
dam
1
sluice gate
RESERVOIR
WATERTON
Drywood Creek
Waterton River
Tp. 4 Rg. 28
Tp. 3 Rg. 28
W/4th Mer.
0
1
2 km
SCALE
N


N
dam
3
2
1
4
spil
Tp. 5
Tp. 4
BLOOD I.R. 148
ST MARY RESERVOIR
canal
2
5
Tp. 4 Rg. 24
Tp. 3 Rg. 24
Cardston
W/4th Mer.
0 1 2 3 4
SCALE


OUTPOST
LAKE
POLICE
OUTPOST
PROVINCIAL
PARK
4
3
2
1
dock
N
Tp. I Rg. 26 W/4th Mer.
0
0.25
0.50 km
SCALE

N.L.C. - B.N.C.
3 3286 10193008 5